Final

Site Investigation Report
Fill Area at Range 30, Parcel 231(7)

Fort McClellan
Calhoun County, Alabama

Prepared for:

U.S. Army Corps of Engineers, Mobile District
109 St. Joseph Street
Mobile, Alabama 36602

Prepared by:

Shaw Environmental, Inc.
312 Directors Drive
Knoxville, Tennessee 37923

Task Orders CK05 and CK09
Contract No. DACA21-96-D-0018
Shaw Project Nos. 774645 and 796886

September 2005

Revision 0

Table of Contents

Page

Table of Contents *(Continued)*

Page

List of Appendices

List of Tables

List of Figures

Executive Summary

In accordance with Contract Number DACA21-96-D-0018, Task Orders CK05 and CK09, Shaw Environmental, Inc. (Shaw) completed a site investigation (SI) at the Fill Area at Range 30, Parcel 231(7), at Fort McClellan in Calhoun County, Alabama. The SI was conducted to determine whether chemical constituents are present at the site as a result of historical mission-related Army activities. The SI consisted of the collection and analysis of eleven surface soil samples, three depositional soil samples, eleven subsurface soil samples, four groundwater samples, one sediment sample, one surface water sample, and one seep sample. Four temporary monitoring wells were installed at the site to facilitate groundwater sample collection and to provide site-specific geological and hydrogeological characterization information. Fill area definition activities, consisting of exploratory trenching and soil boring installation, were also performed to define the horizontal and vertical extent of fill and to characterize its contents. Additional site-related activities included a wetland determination and the removal of asphalt debris from the surface of the fill area.

Based on the fill area definition activities, the horizontal extent of the fill area is estimated to be approximately 3.9 acres. The average depth of fill material is approximately 4 feet below ground surface. The wetland study determined that jurisdictional wetlands do not exist on, or within 200 feet, of the Parcel 231(7) boundary. The site clean-up activity removed approximately 15 cubic yards of asphalt debris from the surface of the fill area.

Chemical analysis of samples collected at the site indicates that metals, volatile organic compounds (VOC), semivolatile organic compounds (SVOC), and pesticides were detected in site media. To evaluate whether the detected constituents pose an unacceptable risk to human health or the environment, the analytical results were compared to human health site-specific screening levels (SSSL), ecological screening values (ESV), and background screening values for FTMC. In addition, site metals data were evaluated using statistical and geochemical methods to determine if the metals in site media were naturally occurring.

Various metals were detected in site media at concentrations exceeding SSSLs and background and, thus, were selected as chemicals of potential concern (COPC). However, the statistical and geochemical evaluations determined that the metals detected in site media were all naturally occurring. In addition to the metals COPCs, the polynuclear aromatic hydrocarbon (PAH) compound benzo(a)pyrene was identified as a COPC because it was detected in one surface soil

sample at an estimated concentration exceeding its SSSL. However, the benzo(a)pyrene result was below its background screening value and is not considered a threat to human health. These conclusions are consistent with the findings of a streamlined human health risk assessment previously completed as part of an engineering evaluation/cost analysis for Parcel 231(7). Furthermore, the suspected source of the PAHs (the asphalt debris) has been removed from the ground surface.

Various metals were detected in site media at concentrations exceeding ESVs and background and, thus, were selected as constituents of potential ecological concern (COPEC). However, the statistical and geochemical evaluations determined that the metals detected in site media were all naturally occurring. Two pesticides from two sample locations, and four PAH compounds from one location, were also identified as COPECs in surface soil. The PAH concentrations, however, were below their respective background screening values, and, as previously noted, the suspected source of the PAHs (asphalt debris) has been removed. Although the pesticides exceeded their ESVs, they were infrequently detected in surface soil and were not detected in any other ecological site media of concern. Furthermore, the Fill Area at Range 30 provides very low quality aquatic and terrestrial habitat. Therefore, it is concluded that the pesticides do not pose an unacceptable threat to ecological receptors at this site. These conclusions are consistent with the findings of a screening-level ecological risk assessment previously completed as part of an engineering evaluation/cost analysis for Parcel 231(7).

Based on the results of the SI, past operations at the Fill Area at Range 30 have not adversely impacted the environment. The metals and chemical compounds detected in site media do not pose an unacceptable risk to human health or the environment. Therefore, Shaw Environmental, Inc. recommends "No Further Action" and unrestricted land reuse with regard to CERCLA-related hazardous substances at the Fill Area at Range 30, Parcel 231(7).

1.0 Introduction

The U.S. Army has selected Fort McClellan (FTMC) located in Calhoun County, Alabama, for closure by the Base Realignment and Closure (BRAC) Commission under Public Laws 100-526 and 101-510. The 1990 Base Closure Act, Public Law 101-510, established the process by which U.S. Department of Defense (DOD) installations would be closed or realigned. The BRAC Environmental Restoration Program requires investigation and cleanup of federal properties prior to transfer to the public domain. The U.S. Army is conducting environmental studies of the impact of suspected contaminants at parcels at FTMC under the management of the U.S. Army Corps of Engineers (USACE), Mobile District. The USACE contracted Shaw Environmental, Inc. (Shaw) (formerly IT Corporation [IT]) to perform the site investigation (SI) at the Fill Area at Range 30, Parcel 231(7), under Contract Number DACA21-96-D-0018, Task Orders CK05 and CK09.

This SI report presents specific information and results compiled from the SI conducted at the Parcel 231(7), including field sampling and analysis, monitoring well installation, fill area definition, wetland determination, and asphalt removal activities.

Furthermore, this SI report is a consolidation of data previously presented in multiple documents associated with Parcel 231(7). Decisions regarding this site made at BRAC Cleanup Team (BCT) meetings are an integral component to the conclusions and recommendations presented herein.

1.1 Project Description

The Fill Area at Range 30 was identified as an area to be investigated prior to property transfer. The site was classified as a Category 7 parcel in the *Final Environmental Baseline Survey, Fort McClellan, Alabama* (EBS) (Environmental Science and Engineering, Inc. [ESE], 1998). Category 7 parcels are areas that are not evaluated and/or that require further evaluation.

A site-specific work plan, comprised of a field sampling plan (SFSP) and a safety and health plan, was finalized in December 1998 (IT, 1998a). The work plan was prepared to provide technical guidance for SI field activities at the Fill Area at Range 30, Parcel 231(7). The site-specific work plan was used as an attachment to the installation-wide work plan (IT, 1998b) and the installation-wide sampling and analysis plan (SAP) (IT, 1998c). The SAP includes the installation-wide safety and health plan and quality assurance plan.

SI field activities included the collection and analysis of 11 surface soil samples, three depositional soil samples, 11 subsurface soil samples, four groundwater samples, one sediment sample, one surface water sample, and one seep water sample. Four groundwater monitoring wells were also installed at the site. In addition, two soil borings were installed in the fill material and two fill material soil samples were collected. Other site-related activities included a wetland determination and removal of asphalt debris from the surface of the site.

The Site Investigation and Fill Area Definition Report documented the initial investigative activities conducted at the Fill Area at Range 30 in 1998 (IT, 2002a). This was followed by an Engineering Evaluation/Cost Analysis (EE/CA) that summarized the site characterization and provided a human health streamlined risk assessment (SRA) and a screening-level ecological risk assessment (SLERA) in accordance with CERCLA criteria (IT, 2002b).

The streamlined (limited or qualitative) risk assessment described in U.S. Environmental Protection Agency (EPA) guidance for landfills is not identical to the SRA method using site-specific screening levels (SSSL) generally performed for FTMC sites. However, the SRA method lends itself very well to the types of risk assessments prescribed in the landfill guidance. The SRA performed as part of the EE/CA concluded that exposure to surface soil, surface water, sediment, and groundwater at Parcel 231(7) did not pose a threat to either of the two receptors evaluated (i.e., resident and groundskeeper) (IT, 2002b).

Additionally, the EE/CA presented the results of the SLERA, which evaluated surface soil, surface water, and sediment at the Parcel 231(7). The SLERA initially identified metals, pesticides, and polynuclear aromatic hydrocarbons (PAH) in surface soil and barium in surface water as constituents of potential ecological concern (COPEC). Upon further evaluation using additional lines-of-evidence, the SLERA concluded that the COPECs were unlikely to pose significant risks to ecological receptors. This conclusion was primarily based on the low quality aquatic habitat available at the site and on the relatively low levels and infrequent detection of the COPECs (IT, 2002b).

1.2 Purpose and Objectives

The SI program was designed to collect data from site media and provide a level of defensible data and information in sufficient detail to determine whether chemical constituents are present at the Fill Area at Range 30, Parcel 231(7), at concentrations that pose an unacceptable risk to human health or the environment. The SI analytical results were compared to residential SSSLs,

ecological screening values (ESV), and background screening values for metals and PAHs. The SSSLs, ESVs, and PAH background screening values are presented in the *Final Human Health and Ecological Screening Values and PAH Background Summary Report* (IT, 2000a). Background metals screening values are presented in the *Final Background Metals Survey Report, Fort McClellan, Alabama* (Science Applications International Corporation [SAIC], 1998). In addition, site metals data were further evaluated using statistical and geochemical methods to determine if the metals were site related.

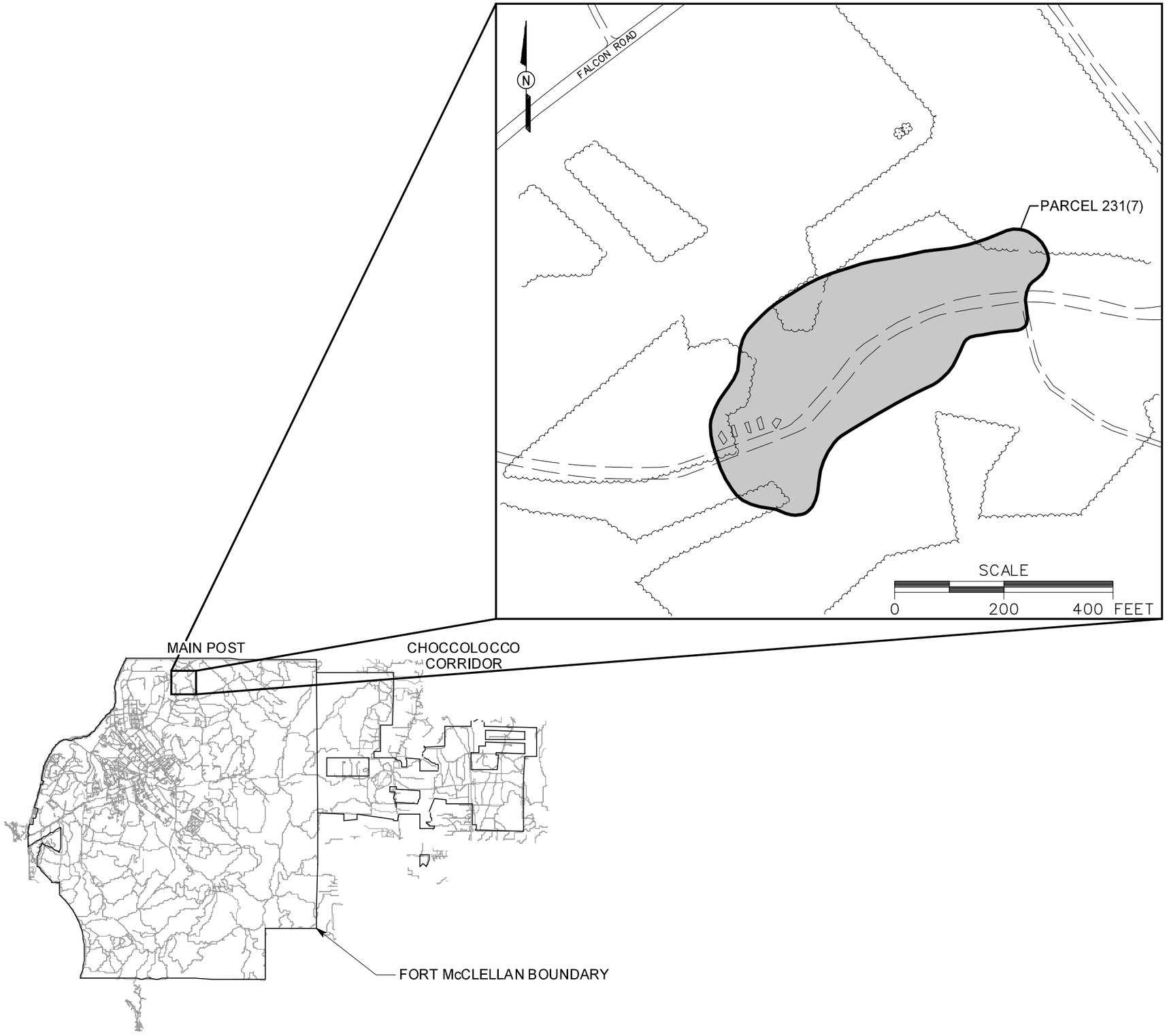
Based on the conclusions presented in this SI report, the BCT will select one of the following courses of action for the site: no further action, additional work, or land use restrictions.

1.3 Site Description and History

The Fill Area at Range 30, Parcel 231(7) is located southeast of Reilly Airfield in the north-central portion of the FTMC Main Post (Figure 1-1). Falcon Road is located approximately 500 feet northwest of Parcel 231(7).

Parcel 231(7) was identified on aerial photographs as a "probable fill area" within the area formerly occupied by Range 30 (ESE, 1998). The exact dates of operation for Range 30 could not be determined, although the area is visible on aerial photographs taken in 1949, 1954, 1961, 1972, and 1982. Based on interviews conducted with FTMC personnel, the range was deactivated sometime between 1983 and 1989. Information regarding disposal practices was not available. Large linear north-south trending features, suspected to be mounds, were observed in the central portion of the site on the aerial photographs; smaller mounds may have been present elsewhere within the parcel (ESE, 1998). The size of the fill area could not be determined; however, it was originally estimated to be about 6 acres (EPA, 1990). Based on the fill area definition activities undertaken for this SI, the area was determined to be approximately 3.9 acres (IT, 2002a).

During an SI site walk in 1998, several piles of construction debris (i.e., asphalt, concrete construction rubble, rock, and dirt) were observed along both sides of a dirt road that traverses the parcel (Figure 1-2). Because of the dense vegetation, it could not be determined whether these piles corresponded with the smaller mounds tentatively identified on the aerial photographs. The large linear mounds observed on the aerial photographs were not evident during the site walk. A soil borrow area, encompassing approximately 100 square feet, was observed just south of the dirt road in the central portion of the site. A seep was noted in the south-central portion of the site. During wet periods, this seep creates a small, non-jurisdictional



LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- TREES / TREELINE
- PARCEL BOUNDARY

FIGURE 1-1
SITE LOCATION MAP
FILL AREA AT RANGE 30
PARCEL 231(7)

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

Shaw™ Shaw Environmental, Inc.

DWG. NO.: ...\796886es.223 | PROJ. NO.: 796886
INITIATOR: G. SISCO | PROJ. MGR.: J. YACOUB
DRAFT. CHCK. BY: | ENGR. CHCK. BY: S. MORAN
DATE LAST REV.: | DRAWN BY:
STARTING DATE: 03/22/04 | DRAWN BY: D. BOMAR
9/9/2005 9:07:31 AM
dbomar
c:\cadd\design\796886es.223

DWG. NO.: 796886es.233 | PROJ. NO.: 796886
INITIATOR: G. SISCO | PROJ. MGR.: J. YACOUB
DRAFT. CHCK. BY: | ENGR. CHCK. BY: S. MORAN
DATE LAST REV.: | DRAWN BY:
STARTING DATE: 08/18/05 | DRAWN BY: D. BOMAR
9/9/2005 9:40:29 AM dbomar 796886es.233

N

E 674,900

E 675,500

N 1,180,400

N 1,179,900

OPEN FIELD

PARCEL 231(7)

MOUNDS OF SOIL, ROCK AND DEBRIS

MOUNDS OF ASPHALT

MOUNDS OF SOIL, ROCK AND DEBRIS

MOUNDS OF DIRT AND ASPHALT

BORROW AREA

CONCRETE DEBRIS

SEEP

MOUNDS OF SOIL, ROCK AND DEBRIS

775

800

825

850

LEGEND

- UNIMPROVED ROADS
- 825 TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- TREES / TREELINE
- MARSH / WET WEATHER
- PARCEL BOUNDARY
- DEPRESSION

SCALE

0 100 200 FEET

FIGURE 1-2
SITE MAP
FILL AREA AT RANGE 30
PARCEL 231(7)

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

Shaw™ Shaw Environmental, Inc.

emergent wetland area adjacent to the dirt road. This isolated emergent wetland area drains into a larger depression located just south of the fill area (Shaw, 2003a).

2.0 Previous Investigations

ESE conducted an EBS to document the current environmental condition of all FTMC property (ESE, 1998). The purpose of the study was to identify sites that, based on available information, have no history of contamination and comply with DOD guidance for fast-track cleanup at closing installations. The EBS also provides a baseline picture of FTMC properties by identifying and categorizing the properties by seven criteria:

1. Areas where no storage, release, or disposal of hazardous substances or petroleum products has occurred (including no migration of these substances from adjacent areas)

2. Areas where only release or disposal of petroleum products has occurred

3. Areas where release, disposal, and/or migration of hazardous substances has occurred, but at concentrations that do not require a removal or remedial response

4. Areas where release, disposal, and/or migration of hazardous substances has occurred, and all removal or remedial actions to protect human health and the environment have been taken

5. Areas where release, disposal, and/or migration of hazardous substances has occurred, and removal or remedial actions are underway, but all required remedial actions have not yet been taken

6. Areas where release, disposal, and/or migration of hazardous substances has occurred, but required actions have not yet been implemented

7. Areas that are not evaluated or require additional evaluation.

The EBS was conducted in accordance with protocols of the Community Environmental Response Facilitation Act (CERFA) (Public Law 102-426) and DOD policy regarding contamination assessment. Record searches and reviews were performed on all reasonably available documents from FTMC, the Alabama Department of Environmental Management (ADEM), EPA Region 4, and Calhoun County, as well as a database search of substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act, petroleum products, and facilities regulated under the Resource Conservation and Recovery Act. Available historical maps and aerial photographs were reviewed to document historical land uses. Personal and telephone interviews of past and present FTMC employees and military personnel were conducted. In addition, visual site inspections were conducted to verify

conditions of specific property parcels. The Fill Area at Range 30, Parcel 231(7), was classified as a CERFA Category 7 parcel in the EBS. Category 7 parcels are areas that have not been evaluated or that require additional evaluation.

3.0 Current Site Investigation Activities

This chapter summarizes SI activities conducted by Shaw at the Fill Area at Range 30, Parcel 231(7), including unexploded ordnance (UXO) avoidance, fill area definition, environmental sampling and analysis, monitoring well installation, and asphalt removal activities.

3.1 UXO Avoidance

UXO avoidance was performed at Parcel 231(7) following methodology outlined in the SAP. Shaw UXO personnel used a low-sensitivity magnetometer to perform a surface sweep of the parcel prior to site access. After the parcel was cleared for access, sample locations were monitored following procedures outlined in the SAP.

3.2 Fill Area Definition

Shaw excavated six exploratory trenches using a remote-controlled excavator because of the potential for UXO. The trenches, totaling 285 feet in length and ranging from 2.5 to 8 feet in depth, were installed to determine the horizontal and vertical extent of the waste fill and to characterize fill contents. In addition, two fill material soil borings were installed to depths of 6 feet below ground surface (bgs); one subsurface soil sample was collected from each boring for laboratory analysis. The trench and fill material soil boring locations are shown on Figure 3-1. The trench logs are provided in Appendix A.

The two fill material soil borings were installed using direct-push technology (DPT), following procedures specified in the SAP. A fill material soil sample was collected from boring FA-231-SB01 at a depth of 2 to 4 feet bgs. A second fill material sample was collected from FA-231-SB02 at a depth 0 to 2 feet bgs. Based on the trenching and soil borings, the average depth of fill material was estimated to be approximately 4 feet bgs (IT, 2002a). The sample and trench locations and rationale are summarized in Table 3-1. The samples were analyzed for the parameters listed in Table 3-2 using methods outlined in Section 3.6. Sample collection logs are included in Appendix B and the boring logs are included in Appendix C.

3.3 Environmental Sampling

The environmental sampling performed during the SI at Parcel 231(7) included the collection of surface and depositional soil samples, subsurface soil samples, groundwater samples, surface water/seep samples, and a sediment sample for chemical analysis. The sample locations were determined by observing site physical characteristics during site reconnaissance and by reviewing documents pertaining to historical site activities. The sample locations, media, and

FIGURE 3-1
SAMPLE LOCATION MAP
FILL AREA AT RANGE 30
PARCEL 231(7)

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

Shaw Environmental, Inc.

DRAWN BY: D. BOMAR | PROJ. MGR.: J. YACOUB | DWG. NO.: ...\796886es.225
STARTING DATE: 03/22/04 | INITIATOR: G. SISCO | PROJ. NO.: 796886
DATE LAST REV.: | DRAFT. CHCK. BY: | ENGR. CHCK. BY: S. MORAN
DRAWN BY: | 9/9/2005 9:35:58 AM | dbomar c:\cadd\design\796886es.225

Table 3-1

Sampling Locations and Rationale
Fill Area at Range 30, Parcel 231(7)
Fort McClellan, Calhoun County, Alabama

Sample/Trench Designation	Sample Medium	Sample Location Rationale
T231-1	Trench	As part of fill area definition activities, a trench was excavated along the southeastern side of fill area. Trench excavation data determined the southeastern extent of fill area boundary and helped characterize contents of mounds.
T231-2	Trench	As part of fill area definition activities, a trench was excavated along the northeastern side of fill area. Trench excavation data determined the northeastern extent of fill area boundary and helped characterize contents of mounds.
T231-3	Trench	As part of fill area definition activities, a trench was excavated along the northern side of fill area. Trench excavation data determined the northern extent of fill area boundary and helped characterize contents of mounds.
T231-4	Trench	As part of fill area definition activities, a trench was excavated along the western side of fill area. Trench excavation data determined the western extent of fill area boundary and helped characterize contents of mounds.
T231-5	Trench	As part of fill area definition activities, a trench was excavated along the western side of fill area. Trench excavation data determined the western extent of fill area boundary and helped characterize contents of mounds.
T231-6	Trench	As part of fill area definition activities, a trench was excavated in the western portion of fill area. Trench excavation data helped characterize contents of mounds.
FA-231-SB01	Fill Material Soil	A fill material soil sample was collected from a boring placed near the eastern boundary of the parcel to determine the vertical extent of fill material and to provide fill material characterization information.
FA-231-SB02	Fill Material Soil	A fill material soil sample was collected from a boring placed near the central portion of the parcel near mounds of dirt and asphalt to determine the vertical extent of fill material and to provide fill material characterization information.
PPMP-231-DEP01	Depositional Soil	A depositional soil sample was collected from an intermittent stream located northeast (downslope) of the site to determine if potential site-specific chemicals have impacted the environment.
PPMP-231-DEP02	Depositional Soil	A depositional soil sample was collected from an intermittent stream located near the center of the site to determine if potential site-specific chemicals have impacted the environment.
PPMP-231-DEP03	Depositional Soil	A depositional soil sample was collected from an intermittent stream located east (downslope) of the site to determine if potential site-specific chemicals have impacted the environment.
PPMP-231-GP01	Surface Soil Subsurface Soil Groundwater	Surface soil, subsurface soil, and groundwater samples were collected approximately 30 feet northwest of the fill area boundary (downslope) to determine if potential site-specific chemicals have impacted the environment.
PPMP-231-GP02	Surface Soil Subsurface Soil Groundwater	Surface soil, subsurface soil, and groundwater samples were collected approximately 110 feet northeast of the parcel (downslope) to determine if potential site-specific chemicals have impacted the environment.
PPMP-231-GP03	Surface Soil Subsurface Soil Groundwater	Surface soil, subsurface soil, and groundwater samples were collected in the western portion of the fill area to determine if potential site-specific chemicals have impacted the environment.
PPMP-231-GP04	Surface Soil Subsurface Soil	Surface soil and subsurface soil samples were collected in the western portion of the fill area to determine if potential site-specific chemicals have impacted the environment.

Table 3-1

Sampling Locations and Rationale
Fill Area at Range 30, Parcel 231(7)
Fort McClellan, Calhoun County, Alabama

Sample/Trench Designation	Sample Medium	Sample Location Rationale
PPMP-231-GP05	Surface Soil Subsurface Soil	Surface soil and subsurface soil samples were collected approximately 140 feet west of the fill area to determine if potential site-specific chemicals have impacted the environment.
PPMP-231-GP06	Surface Soil Subsurface Soil	Surface soil and subsurface soil samples were collected approximately 145 feet northwest (downslope) of the fill area to determine if potential site-specific chemicals have impacted the environment.
PPMP-231-GP07	Surface Soil Subsurface Soil	Surface soil and subsurface soil samples were collected approximately 45 feet northeast of the fill area to determine if potential site-specific chemicals have impacted the environment.
PPMP-231-GP08	Surface Soil Subsurface Soil	Surface soil and subsurface soil samples were collected in the central portion of the fill area to determine if potential site-specific chemicals have impacted the environment.
PPMP-231-GP09	Surface Soil Subsurface Soil	Surface soil and subsurface soil samples were collected in the central portion of the fill area, near a borrow area, to determine if potential site-specific chemicals have impacted the environment.
PPMP-231-GP10	Surface Soil Subsurface Soil	Surface soil and subsurface soil samples were collected in the northwestern portion of the fill area to determine if potential site specific chemicals have impacted the environment.
PPMP-231-GP11	Surface Soil Subsurface Soil Groundwater	Surface soil, subsurface soil, and groundwater samples were collected in the southwestern portion of the fill area to determine if potential site-specific chemicals have impacted the environment.
PPMP-231-SW/SD01	Surface Water Sediment	Surface water and sediment samples were collected east (upslope) of the fill area to determine if potential site-specific chemical have impacted the environment.
PPMP-231-SEP01	Seep Water	A water sample was collected from a seep located in the southern portion of the fill area to determine if potential site-specific chemicals have impacted the environment.

Table 3-2

Soil Sample Designations and Analytical Parameters
Fill Area at Range 30, Parcel 231(7)
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft bgs)	QA/QC Samples			Analytical Parameters
			Field Duplicates	Field Splits	MS/MSD	
FA-231-SB01	FA-231-SB01-DS-DD0021-REG	2-4				Metals, VOCs, SVOCs, Pesticides, Herbicides, PCBs, and Explosives
FA-231-SB02	FA-231-SB02-DS-DD0022-REG	0-2	FA-231-SB02-DS-DD0023-FD			Metals, VOCs, SVOCs, Pesticides, Herbicides, PCBs, and Explosives
PPMP-231-DEP01	PPMP-231-DEP01-DEP-KT0024-REG	0-1				Metals, VOCs, SVOCs, Pesticides, Herbicides, PCBs, and Explosives
PPMP-231-DEP02	PPMP-231-DEP02-DEP-KT0030-REG	0-0.3				Metals, VOCs, SVOCs, Pesticides, Herbicides, PCBs, and Explosives
PPMP-223-DEP03	PPMP-223-DEP03-DEP-KT0031-REG	0-0.3				Metals, VOCs, SVOCs, Pesticides, Herbicides, PCBs, and Explosives
PPMP-231-GP01	PPMP-231-GP01-SS-KT0001-REG	0-1			PPMP-231-GP01-SS-KT0001-MS/MSD	Metals, VOCs, SVOCs, Pesticides, Herbicides, PCBs, and Explosives
	PPMP-231-GP01-DS-KT0002-REG	9-11				
PPMP-231-GP02	PPMP-231-GP02-SS-KT0003-REG	0-1				Metals, VOCs, SVOCs, Pesticides, Herbicides, PCBs, and Explosives
	PPMP-231-GP02-DS-KT0004-REG	10-12				
PPMP-231-GP03	PPMP-231-GP03-SS-KT0005-REG	0-1				Metals, VOCs, SVOCs, Pesticides, Herbicides, PCBs, and Explosives
	PPMP-231-GP03-SS-KT0005R-REG*	0-1				
	PPMP-231-GP03-DS-KT0006-REG	9-11				
	PPMP-231-GP03-DS-KT0006R-REG*	9-11				
PPMP-231-GP04	PPMP-231-GP04-SS-KT0007-REG	0-1				Metals, VOCs, SVOCs, Pesticides, Herbicides, PCBs, and Explosives
	PPMP-231-GP04-SS-KT0007R-REG*	0-1				
	PPMP-231-GP04-DS-KT0008-REG	9-12				
	PPMP-231-GP04-DS-KT0008R-REG*	9-12				
PPMP-231-GP05	PPMP-231-GP05-SS-KT0009-REG	0-1	PPMP-231-GP05-SS-KT0010-FD	PPMP-231-GP05-SS-KT0011-FS		Metals, VOCs, SVOCs, Pesticides, Herbicides, PCBs, and Explosives
	PPMP-231-GP05-DS-KT0012-REG	6-9				
PPMP-231-GP06	PPMP-231-GP06-SS-KT0013-REG	0-1				Metals, VOCs, SVOCs, Pesticides, Herbicides, PCBs, and Explosives
	PPMP-231-GP06-DS-KT0014-REG	9-12				
	PPMP-231-GP06-DS-KT0014R-REG*	9-12				
PPMP-231-GP07	PPMP-231-GP07-SS-KT0016-REG	0-1				Metals, VOCs, SVOCs, Pesticides, Herbicides, PCBs, and Explosives
	PPMP-231-GP07-DS-KT0017-REG	9-12	PPMP-231-GP07-DS-KT0015-FD			
PPMP-231-GP08	PPMP-231-GP08-SS-KT0018-REG	0-1				Metals, VOCs, SVOCs, Pesticides, Herbicides, PCBs, and Explosives
	PPMP-231-GP08-SS-KT0018R-REG*	0-1				
	PPMP-231-GP08-DS-KT0019-REG	9-12				
	PPMP-231-GP08-DS-KT0019R-REG*	9-12				
PPMP-231-GP09	PPMP-231-GP09-SS-KT0020-REG	0-1				Metals, VOCs, SVOCs, Pesticides, Herbicides, PCBs, and Explosives
	PPMP-231-GP09-DS-KT0029-REG	4-7				

Table 3-2

Soil Sample Designations and Analytical Parameters
Fill Area at Range 30, Parcel 231(7)
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft bgs)	QA/QC Samples			Analytical Parameters
			Field Duplicates	Field Splits	MS/MSD	
PPMP-231-GP10	PPMP-231-GP10-SS-KT0021-REG	0-1				Metals, VOCs, SVOCs, Pesticides, Herbicides, PCBs, and Explosives
	PPMP-231-GP10-SS-KT0021R-REG*	0-1				
	PPMP-231-GP10-DS-KT0022-REG	9-12				
	PPMP-231-GP10-DS-KT0022R-REG*	9-12				
PPMP-231-GP11	PPMP-231-GP11-SS-KT0025-REG	0-1				Metals, VOCs, SVOCs, Pesticides, Herbicides, PCBs, and Explosives
	PPMP-231-GP11-DS-KT0026-REG	10-12				

* Resample analyzed for organophosphorus pesticides only because laboratory QA/QC criteria out of limits in original sample.

FD - Field duplicate.
FS - Field split.
ft. bgs - Feet below ground surface.
MS/MSD - Matrix spike/matrix spike duplicate.
PCB - Polychlorinated biphenyl.
QA/QC - Quality assurance/quality control.
REG - Regular field sample.
SVOC - Semivolatile organic compound.
VOC - Volatile organic compound.

rationale are summarized in Table 3-1. Sampling locations are shown on Figure 3-1. Samples were submitted for laboratory analysis of site-related parameters listed in Section 3.6.

3.3.1 Surface and Depositional Soil Sampling

Eleven surface soil samples and three depositional soil samples were collected at Parcel 231(7), as shown on Figure 3-1. Soil sampling locations and rationale are presented in Table 3-1. Sample designations and analytical parameters are listed in Table 3-2. Sample locations were determined in the field by the on-site geologist based on the sampling rationale, presence of surface structures, and site topography.

Sample Collection. Surface and depositional soil samples were collected from the uppermost foot of soil using either a stainless-steel hand auger or a DPT sampling system, following methodology specified in the SAP. Surface and depositional soil samples were collected by first removing surface material (e.g., rocks, vegetation) from the immediate sample area. The soil was then collected with the sampling device and screened with a photoionization detector (PID) in accordance with procedures outlined in the SAP. The soil fraction for volatile organic compound (VOC) analysis was collected directly from the sample device using three EnCore® samplers. The remaining soil was then transferred to a clean stainless-steel bowl, homogenized, and placed in the appropriate sample containers. The samples were analyzed for the parameters listed in Table 3-2 using methods outlined in Section 3.6. Sample collection logs are included in Appendix B.

3.3.2 Subsurface Soil Sampling

Eleven subsurface soil samples were collected at Parcel 231(7), as shown on Figure 3-1. Subsurface soil sampling locations and rationale are presented in Table 3-1. Subsurface soil sample designations, depths, and analytical parameters are listed in Table 3-2. Soil boring locations were determined in the field by the on-site geologist based on the sampling rationale, presence of surface structures, and site topography.

Sample Collection. Subsurface soil samples were collected from soil borings at depths greater than 1 foot bgs in the unsaturated zone. The soil borings were advanced and soil samples collected using a DPT sampling system, following procedures specified in the SAP. Sample collection logs are included in Appendix B. The samples were analyzed for the parameters listed in Table 3-2 using methods outlined in Section 3.6.

Subsurface soil samples were collected continuously to 12 feet bgs or until DPT sampler refusal was encountered. Samples were field screened using a PID to measure volatile organic vapors.

The soil sample displaying the highest reading was selected and sent to the laboratory for analysis; however, at those locations where PID readings were below background, the deepest soil sample interval above the saturated zone was submitted for analysis. The soil fraction for VOC analysis was collected directly from the sample device using three EnCore samplers. The remaining sample was then transferred to a clean stainless-steel bowl, homogenized, and placed in the appropriate sample containers. The on-site geologist constructed a detailed boring log for each soil boring. The boring logs are included in Appendix C. At the completion of soil sampling, boreholes were abandoned with hydrated bentonite pellets following borehole abandonment procedures summarized in the SAP.

3.3.3 Monitoring Well Installation

Four temporary monitoring wells were installed at the Fill Area at Range 30, Parcel 231(7), to collect groundwater samples for laboratory analysis. The well locations are shown on Figure 3-1 and well construction details are summarized in Table 3-3. The well construction logs are included in Appendix C.

Shaw contracted Miller Drilling Company to install the wells at Parcel 231(7) using a hollow-stem auger drill rig, following procedures outlined in the SAP. The borehole for each well was advanced with a 4¼-inch inside diameter (ID) hollow-stem auger from ground surface to the first water-bearing zone in residuum at the well location. The borehole was augered to the completion depth of the DPT soil boring, and soil samples were collected from that depth to the bottom of the auger borehole. A 2-foot-long, 2-inch ID carbon steel split-spoon sampler was driven at 5-foot intervals to collect residuum for observing and describing lithology. Where split-spoon refusal was encountered, the auger was advanced until the first water-bearing zone was encountered. The on-site geologist logging the auger boreholes at the site continued the detailed lithological log for each borehole from the depth of split-spoon refusal to the bottom of the auger borehole by logging the auger drill cuttings. The split-spoon samples and drill cuttings were logged to determine lithologic changes and to approximate the depth at which groundwater was encountered during drilling. This information was used to determine the optimal placement of the monitoring well screen interval and to provide site-specific geologic and hydrogeologic information. Soil characteristics were described using the "Burmeister Identification System" described in Hunt (1986) and the Unified Soil Classification System as outlined in American Society for Testing and Materials (ASTM) Method D2488 (ASTM, 2000). The lithological logs are included in Appendix C.

Table 3-3

Monitoring Well Construction Summary
Fill Area at Range 30, Parcel 231(7)
Fort McClellan, Calhoun County, Alabama

Well Location	Northing	Easting	Ground Elevation (ft amsl)	TOC Elevation (ft amsl)	Well Depth (ft bgs)	Screen Length (ft)	Screen Interval (ft bgs)	Well Material
PPMP-231-GP01	1180250.12	674902.70	765.60	767.41	38.25	15	23.0 - 38.0	2" ID Sch. 40 PVC
PPMP-231-GP02	1180468.27	675290.82	770.57	770.91	34.75	15	19.5 - 34.5	2" ID Sch. 40 PVC
PPMP-231-GP03	1180105.56	674934.89	769.30	770.71	38.0	15	22.75 - 37.75	2" ID Sch. 40 PVC
PPMP-231-GP11	1179996.19	674959.13	773.79	774.08	39.0	20	18.75 - 38.75	2" ID Sch. 40 PVC

Permanent wells installed using hollow-stem auger.

Horizontal coordinates referenced to the U.S. State Plane Coordinate System, Alabama East Zone, North American Datum of 1983.
Elevations referenced to the North American Vertical Datum of 1988.

2" ID Sch. 40 PVC - 2-inch inside diameter, Schedule 40, polyvinyl chloride.
amsl - Above mean sea level.
bgs - Below ground surface.
ft - Feet.
TOC - Top of casing.

Upon reaching the target depth in each borehole, a 15- or 20-foot length of 2-inch ID, 0.010-inch factory slotted, Schedule 40 PVC screen with a PVC end cap was placed through the auger to the bottom of the borehole. The screen and end cap were attached to 2-inch ID, flush-threaded Schedule 40 PVC riser. A sand pack consisting of Number 1 filter sand (environmentally safe, clean fine sand, sieve size 20 to 40) was tremied around the well screen to approximately 3 feet above the top of the well screen. The wells were surged using a solid PVC surge block for approximately 10 minutes or until no more settling of the filer sand occurred. A bentonite seal, consisting of approximately 3 feet of bentonite pellets, was placed immediately on top of the sand pack and hydrated with potable water. If the bentonite seal was installed below the water table surface, the bentonite pellets were allowed to hydrate in the groundwater. Bentonite seal placement and hydration followed procedures outlined in the SAP. A locking well cap was placed on the PVC riser. The well surface completion consisted of attaching plastic sheeting around the PVC riser using duct tape. Sand bags were used to secure the plastic sheeting to the ground surface around the wellhead.

The wells were developed by surging and pumping with a submersible pump in accordance with methodology outlined in the SAP. The submersible pump used for well development was moved in an up-and-down fashion to encourage any residual well installation materials to enter the well. These materials were then pumped out of the well to re-establish the natural hydraulic flow conditions. Development continued until the water turbidity was less than 20 nephelometric turbidity units or for a maximum of 8 hours. The well development logs are included in Appendix D.

3.3.4 Water Level Measurements

The depth to groundwater was measured in the wells at Parcel 231(7) on July 26, 2002, following procedures outlined in the SAP. Depth to groundwater was measured with an electronic water-level meter. The meter probe and cable were cleaned before use at each well, following decontamination methodology presented the SAP. Measurements were referenced to the top of the PVC well casing, as summarized in Table 3-4.

3.3.5 Groundwater Sampling

Groundwater samples were collected from each of the four monitoring wells installed at Parcel 231(7). The well/groundwater sample locations are shown on Figure 3-1. The groundwater sampling locations and rationale are listed in Table 3-1. Groundwater sample designations and analytical parameters are listed in Table 3-5.

Table 3-4

Groundwater Elevations
Fill Area at Range 30, Parcel 231(7)
Fort McClellan, Calhoun County, Alabama

Well Location	Date	Depth to Water (ft BTOC)	Top of Casing Elevation (ft amsl)	Ground Elevation (ft amsl)	Groundwater Elevation (ft amsl)
PPMP-231-GP01	26-Jul-02	33.58	767.41	765.60	733.83
PPMP-231-GP02	26-Jul-02	22.58	770.91	770.57	748.33
PPMP-231-GP03	26-Jul-02	38.06	770.71	769.30	732.65
PPMP-231-GP11	26-Jul-02	40.50	774.08	773.79	733.58

Elevations referenced to the North American Vertical Datum of 1988.

amsl - Above mean sea level.
BTOC - Below top of casing.
ft - Feet.

Table 3-5

Groundwater Sample Designations and Analytical Parameters
Fill Area at Range 30, Parcel 231(7)
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	QA/QC Samples			Analytical Parameters
		Field Duplicates	Field Splits	MS/MSD	
PPMP-231-GP01	PPMP-231-GP01-GW-KT3001-REG			PPMP-231-GP01-GW-KT3001-MS/MSD	Metals, VOCs, SVOCs, Pesticides, Herbicides, PCBs, and Explosives
PPMP-231-GP02	PPMP-231-GP02-GW-KT3002-REG	PPMP-231-GP02-GW-KT3003-FD	PPMP-231-GP02-GW-KT3004-FS		
PPMP-231-GP03	PPMP-231-GP03-GW-KT3005-REG				
PPMP-231-GP11	PPMP-231-GP11-GW-KT3006-REG				

FD- Field duplicate.
FS- Field split.
MS/MSD - Matrix spike/matrix spike duplicate.
PCB - Polychlorinated biphenyl.
QA/QC - Quality assurance/quality control.
REG - Regular field sample.
SVOC - Semivolatile organic compound.
VOC - Volatile organic compound.

Sample Collection. The groundwater samples were collected using a submersible pump equipped with Teflon™ tubing, following procedures outlined in the SAP. Groundwater was sampled after purging a minimum of three well volumes and after field parameters (temperature, pH, specific conductivity, oxidation-reduction potential, dissolved oxygen, and turbidity) stabilized. Groundwater field parameters were measured using a calibrated water-quality meter, as summarized in Table 3-6. Sample collection logs are included in Appendix B. The samples were analyzed for the parameters listed in Table 3-5 using methods outlined in Section 3.6.

3.3.6 Surface Water Sampling

One surface water sample was collected at Parcel 231(7) at the location shown on Figure 3-1. The surface water sampling location and rationale are listed in Table 3-1. The surface water sample designation and analytical parameters are listed in Table 3-7. The actual sampling location was determined in the field, based on drainage pathways and field observations.

Sample Collection. The surface water sample was collected in accordance with procedures specified in the SAP. The sample was collected by dipping a stainless-steel pitcher in the water and pouring the water into the sample containers. The surface water sample was collected after field parameters had been measured using a calibrated water quality meter. Surface water field parameters are listed in Table 3-6. The sample collection log is included in Appendix B. The sample was analyzed for the parameters listed in Table 3-7 using methods outlined in Section 3.6.

3.3.7 Sediment Sampling

One sediment sample was collected at the same location as the surface water sample, as shown on Figure 3-1. The sediment sampling location and rationale are presented in Table 3-1. The sediment sample designation and analytical parameters are listed in Table 3-7. The actual sediment sampling location was determined in the field, based of drainage pathways and field observations.

Sample Collection. The sediment sample was collected in accordance with the procedures specified in the SAP. Sediment was collected with a stainless-steel hand auger and placed in a clean stainless-steel bowl. Samples for VOC analysis were then immediately collected from the stainless-steel bowl with three EnCore samplers. The remaining sample was homogenized and placed in the appropriate containers. The sample collection log is included in Appendix B. The sediment sample was analyzed for the parameters listed in Table 3-7 using methods outlined in Section 3.6.

Table 3-6

Groundwater, Surface Water, and Seep Water Field Parameters
Fill Area at Range 30, Parcel 231(7)
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Date	Media	Specific Conductivity (mS/cm)[a]	Dissolved Oxygen (mg/L)	ORP (mV)	Temperature (°C)	Turbidity (NTU)	pH (SU)
PPMP-231-GP01	7-Apr-99	GW	0.031	4.00	292	21.6	>1000	NR
PPMP-231-GP02	8-Apr-99	GW	0.026	5.38	280	17.7	9.1	4.93
PPMP-231-GP03	7-Apr-99	GW	0.021	6.45	385	21.0	1.1	4.91
PPMP-231-GP11	7-Apr-99	GW	0.015	6.50	315	17.9	2.1	4.86
PPMP-231-SEP01	8-Feb-99	SEP	0.438	10.36	224	17.0	1.2	7.85
PPMP-231-SW/SD01	10-Mar-99	SW	0.033	6.35	NR	10.6	33	6.05

[a] Specific conductivity values standardized to millisiemens per centimeter.

°C - Degrees Celsius.
GW - Groundwater.
mg/L - Milligram per liter.
mS/cm - Millisiemen per centimeter.
mV - Millivolt.
NR - Not recorded.
NTU - Nephelometric turbidity unit.
ORP - Oxidation-reduction potential.
SU - Standard unit.
SW - Surface water.
SEP - Seep water.

Table 3-7

Surface Water, Sediment, and Seep Sample Designations
Fill Area at Range 30, Parcel 231(7)
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	QA/QC Samples[a]			Analytical Parameters
		Field Duplicates	Field Splits	MS/MSD	
PPMP-231-SW/SD01	PPMP-231-SW/SD01-SW-KT2004-REG				Metals, VOCs, SVOCs, Pesticides, Herbicides, PCBs, Explosives, TOC[b], and Grain Size[b]
	PPMP-231-SW/SD01-SD-KT1001-REG				
PPMP-231-SEP01	PPMP-231-SEP01-SW-KT2001-REG				Metals, VOCs, SVOCs, Pesticides, Herbicides, PCBs, and Explosives

[a] No QA/QC samples specified in site-specific field sampling plan.
[b] Sediment sample only.

MS/MSD - Matrix spike/matrix spike duplicate.
PCB - Polychlorinated biphenyl.
QA/QC - Quality assurance/quality control.
REG - Regular field sample.
VOC - Volatile organic compound.
SVOC - Semivolatile organic compound.
SD - Sediment.
SEP - Seep water.
SW - Surface water.
TOC - Total organic carbon.

3.3.8 Seep Water Sampling

One seep water sample was collected at the location shown on Figure 3-1. The seep water sampling location and rationale are presented in Table 3-1. The seep sample designation and analytical parameters are listed in Table 3-7.

Sample Collection. The seep water sample was collected using the same procedures described previously for surface water sampling. The sample collection log is included in Appendix B. The seep water sample was analyzed for the parameters listed in Table 3-7 using methods outlined in Section 3.6.

3.4 Asphalt Removal and Disposal

During the SI site walk performed in 1998, several piles of construction debris (i.e., asphalt, concrete construction rubble, rock, and dirt) were observed along both sides of the dirt road that traverses the parcel. In September 2003, the fill area surface was cleared so that the debris could be removed. A backhoe was used to remove approximately 15 cubic yards of asphalt debris from the surface. The debris was transported by East Alabama Portables and disposed as nonhazardous waste at the Calhoun County Landfill. The fill area was graded and sown with grass to prevent erosion. A field representative with the USACE conducted a site visit and approved the site reclamation activities.

3.5 Surveying

Trench, soil boring, and monitoring well locations were surveyed using global positioning system and conventional civil survey techniques described in the SAP. Horizontal coordinates were referenced to the U.S. State Plane Coordinate System, Alabama East Zone, North American Datum of 1983. Elevations were referenced to the North American Vertical Datum of 1988. Horizontal coordinates and elevations are included in Appendix E.

3.6 Analytical Program

Samples collected during the SI were analyzed for various chemical and physical parameters based on the potential site-specific chemicals and on EPA, ADEM, FTMC, and USACE requirements. The samples collected at Parcel 231(7) were analyzed for the following parameters using EPA SW-846 methods, including Update III methods where applicable:

- Target compound list (TCL) VOCs – EPA Method 8260B
- TCL semivolatile organic compounds (SVOC) – EPA Method 8270C
- Target analyte list metals – EPA Methods 6010B/7470A/7471A
- Chlorinated pesticides – EPA Method 8081A

- Organophosphorus pesticides – EPA Method 8141A
- Chlorinated herbicides – EPA Method 8151A
- Polychlorinated biphenyls – EPA Method 8082
- Nitroaromatic/nitramine explosives – EPA Method 8330.

In addition, the sediment sample was analyzed for total organic carbon (TOC) content (EPA Method 9060) and grain size (ASTM Method D422).

3.7 Sample Preservation, Packaging, and Shipping

Sample preservation, packaging, and shipping followed requirements specified in the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SI are listed in the SAP. Sample documentation and chain of custody records were completed as specified in the SAP.

Completed analysis request and chain-of-custody records (Appendix B) were included with each shipment of sample coolers to the analytical laboratory. Samples were shipped to Quanterra Environmental Services in Knoxville, Tennessee. Split samples were shipped to the USACE South Atlantic Division Laboratory in Marietta, Georgia.

3.8 Investigation-Derived Waste Management and Disposal

Investigation-derived waste (IDW) was managed and disposed as outlined in the SAP. The IDW generated was segregated as follows:

- Drill cuttings
- Purge water from well development, sampling activities, and decontamination fluids
- Spent well materials and personal protective equipment.

Solid IDW was stored inside the fenced area surrounding Buildings 335 and 336 in lined roll-off bins prior to characterization and final disposal. Solid IDW was characterized using toxicity characteristic leaching procedure analyses. Based on the results, solid IDW generated during the SI was disposed as nonhazardous waste at the Industrial Waste Landfill on the Main Post of FTMC.

Liquid IDW was contained in the 20,000-gallon sump associated with the Building T-338 vehicle washrack. Liquid IDW was characterized by VOC, SVOC, and metals analyses. Based on the analyses, liquid IDW was discharged as nonhazardous waste to the FTMC Wastewater Treatment Plant on the Main Post.

3.9 Variances/Nonconformances

Five variances to the SFSP were recorded during completion of the SI at the Fill Area at Range 30, Parcel 231(7). The variances did not alter the intent of the investigation or the sampling rationale presented in the SFSP. The variances are summarized in Table 3-8 and the variance reports are included in Appendix F.

Although a nonconformance was not recorded, well development at temporary well PPMP-231-GP01 did not meet the requirements as stated in the SAP. The well development was discontinued prior to meeting the minimum duration or turbidity criteria. This occurred because the temporary well never showed signs of stabilizing; therefore, a decision was made by the site manager to discontinue well development. A discussion on the possible effects this may have had on the analytical results is provided in Section 5.3.

3.10 Data Quality

The field sample analytical data are presented in tabular form in Appendix G. The field samples were collected, documented, handled, analyzed, and reported in a manner consistent with the SI work plans, the FTMC SAP and quality assurance plan, and standard, accepted methods and procedures. Data were reported and evaluated in accordance with Corps of Engineers South Atlantic Savannah Level B criteria (USACE, 2001b) and the stipulated requirements for the generation of definitive data presented in the SAP. Chemical data were reported via hard-copy data packages by the laboratory using Contract Laboratory Program-like forms.

Data Validation. The reported analytical data were validated in accordance with EPA National Functional Guidelines by Level III criteria. The data validation summary reports are included in Appendix H. Selected results were rejected or otherwise qualified based on the implementation of accepted data validation procedures and practices. These qualified parameters are highlighted in the report. The validation-assigned qualifiers were added to the Shaw Environmental Management System™ database for tracking and reporting. The qualified data were used in the comparisons to the SSSLs and ESVs. Rejected data (assigned an "R" qualifier) were not used in the comparisons to the SSSLs and ESVs. The data presented in this report, except where qualified, meet the principle data quality objective for this SI.

Table 3-8

Variances to the Site-Specific Field Sampling Plan
Fill Area at Range 30, Parcel 231(7)
Fort McClellan, Calhoun County, Alabama

Variance to the SFSP	Justification for Variance	Impact to Site Investigation
Sample location PPMP-231-GP01 was moved approximately 70 feet southwest of the proposed location.	Fill material and construction debris was encountered during drilling operations.	None. The temporary well was moved so that the integrity of the well screen and filter pack was not jeopardized.
Sample location FTA-151-GP07 was renamed PPMP-231-GP11 and advanced at Range 30.	The sample location could not be advanced at Parcel 151(7), so it was moved to a separate parcel to satisfy data quality objectives.	None. The sample location was advanced at Range 30, satisfying data quality objectives.
Soil boring FA-231-SB01 was moved approximately 50 feet north of the proposed location.	Fill material was not present at the proposed location during drilling and split-spoon sampling procedures.	None. Relocating the soil boring provided an accurate characterization of the type and vertical extent of fill material. Soil samples were successfully collected from the fill material for chemical analysis.
Soil boring FA-231-SB02 was moved approximately 15 feet southeast of the proposed location.	Fill material was not present at the proposed location during drilling and split-spoon sampling procedures.	None. Relocating the soil boring provided an accurate characterization of the type and vertical extent of fill material. Soil samples were successfully collected from the fill material for chemical analysis.
A seep water sample was not collected at sample location PPMP-231-SEP02.	A seep water sample was not collected because water was not present at the time of sample collection. Therefore, a depositional sample (PPMP-231-DEP02) was collected at this location.	None. Data from the depositional soil sample provided information to determine the presence or absence of contamination at this location.

SFSP – Site-specific field sampling plan.

4.0 Site Characterization

This chapter presents the results of the fill area definition and wetland determination activities conducted at the Fill Area at Range 30, Parcel 231(7) as well as information on regional and site geology, and site hydrology.

4.1 Fill Area Definition

Trenching. Six exploratory trenches were excavated at the Fill Area at Range 30 to determine the extent and character of the fill material. The 3-foot-wide trenches totaled 285 feet in length and were excavated to depths ranging from 2.5 to 8 feet bgs. The trench locations are shown on Figure 3-1 and the trench logs are included in Appendix A. The trench data are summarized in Table 4-1.

Trench location T231-1 was placed to characterize the southeastern horizontal extent of the fill area and the mounds located with this area. Trench T231-2 was placed to characterize the northeastern horizontal extent of the fill area. Trench T231-3 was placed to characterize the northern horizontal extent of the fill area and the mounds at this location. Trench T231-4 was placed to characterize the western horizontal extent of the fill area and the mounds at this location. Trenches T231-5 and T231-6 were placed to characterize mounds located in the western portion of the fill area. Fill material was not observed in trench T231-3. Fill material was observed in all of the other trenches and included: metal pipes, metal straps, plastic bags, plastic sheeting, cans, styrofoam, plastic oil containers, corrugated pipe, glass, bricks, organic debris, soil materials, coal, cobbles, and pieces of concrete and asphalt. Medical waste was not observed in any of the trenches or fill material borings.

Fill Material Borings. Two borings were installed at the Fill Area at Range 30. Fill material borings were installed to a depth of six feet bgs using DPT. The fill material boring logs (Appendix C) provide detailed characterization of the fill materials. Fill material boring information is summarized in Table 4-2. One subsurface soil/fill material sample was collected at a depth of 2 to 4 feet bgs (FA-231-SB01) and one was collected from the surface to 2 feet bgs (FA-231-SB02). The samples were sent for laboratory analysis. The analytical results are presented in Section 5.6.

Table 4-1

Trenching Summary
Fill Area at Range 30, Parcel 231(7)
Fort McClellan, Calhoun County, Alabama

Trench Designation	Trench Length (ft)	Fill Depth (ft)	Trench Depth (ft)	Horizontal Extent of Fill Material Encountered in Trench	Description of Fill Material
T231-1	50	3	6 NW end to 1 SE end	0 to 15 ft Fill, 15 to 20 ft Native, 20 to 40 ft Fill, and 40 to 50 ft Native NW/SE view	Light brown silt, some clay, cobbles, concrete chunks, steel pipe, pieces of coal, glass, red bricks, ceramic pieces, tree limbs, leaves, and pine needles.
T231-2	35	8	8	0 to 20 ft Fill and 20 to 35 ft Native SW/NE view	Light brown clay with sand, some silt, roots, concrete chunks, sardine can, and cobbles.
T231-3	50	Not encountered	6	0 to 50 ft Native SE/NW view	Fill material not encountered.
T231-4	50	2	2.5	0 to 50 ft Fill SE/NW view	Red-orange sand and silt, some limestone, concrete chunks, metal straps, plastic oil containers, metal corrugated pipe, styrofoam, a beer can, plastic sheeting, and plastic food container.
T231-5	50	4	4.5	0 to 35 ft Fill and 35 to 50 ft Native E/W view	Red-orange sand and silt, some clay, concrete chunks, metal wrapped wire, metal straps, tree limbs, pine needles, and leaves.
T231-6	50	5	5.5	0 to 50 ft Fill E/W view	Light brown silt, some clay, some gravel, roots, piping, pieces of carpet, plastic trash bags, red bricks, and a beer can.

Note: All trenches are 3 feet in width.

bgs - Below ground surface.
E/W – East/west.
ft - Feet.
N/S – North/south.
NW/SE – Northwest/southeast.
S/N – South/north.
SE/NW – Southeast/northwest.
SW/NE – Southwest/northeast.
W/E – West/east.

Table 4-2

Fill Material Borings
Fill Area at Range 30, Parcel 231(7)
Fort McClellan, Calhoun County, Alabama

Boring Location	Depth of Fill Material (ft bgs)	Total Boring Depth (ft bgs)	Analytical Sample Interval (ft bgs)	Fill Material Description
FA-231-SB01	0-4	6	2-4	Yellow-orange clay and rounded 1-2" diameter quartz gravel, some greenish gray shale (highly weathered), pieces of coal, and trace of ash.
FA-231-SB02	0-2	6	0-2	Various colored brown to yellowish-orange clay, trace silt, some rounded and angular 1-2" diameter gravel.

bgs - Below ground surface.
ft - Feet.

Extent of Fill Material. Based on the results of the exploratory trenching, the horizontal extent of the fill area encompasses approximately 3.9 acres to an average depth of approximately 4 feet bgs. The estimated volume of fill material present in Parcel 231(7) is approximately 11,300 cubic yards (IT, 2002b). Figure 3-1 shows the location of this fill material.

4.2 Wetland Determination

An assessment of wetlands located within an approximate 200-foot perimeter of the Fill Area at Range 30 was performed in December 2002 (Shaw, 2003a). The wetland determination was conducted in accordance with the *Corps of Engineers Wetlands Delineation Manual* (USACE, 1987) to determine the extent of federally regulated jurisdictional wetlands and waters of the United States. The USACE-Mobile District approved the wetland determination for a 5-year period on April 2, 2003.

No jurisdictional wetlands were observed on or within 200 feet of Parcel 231(7). However, a small non-jurisdictional emergent wetland area was observed immediately adjacent to the dirt road within the southern portion of the parcel. This small area drains into a larger depression located immediately south of the parcel boundary. This open water feature, which includes the emergent area along the dirt road, is isolated and does not have any associated wetland fringe areas (Shaw, 2003a). It should be noted that gray bat habitat does not exist in the vicinity of Parcel 231(7).

4.3 Regional and Site Geology

4.3.1 Regional Geology

Calhoun County includes parts of two physiographic provinces, the Piedmont Upland Province and the Valley and Ridge Province. The Piedmont Upland Province occupies the extreme eastern and southeastern portions of the county and is characterized by metamorphosed sedimentary rocks. The generally accepted range in age of these metamorphics is Cambrian to Devonian.

The majority of Calhoun County, including the Main Post of FTMC, lies within the Appalachian fold-and-thrust structural belt (Valley and Ridge Province) where southeastward-dipping thrust faults with associated minor folding are the predominant structural features. The fold-and-thrust belt consists of Paleozoic sedimentary rocks that have been asymmetrically folded and thrust-faulted, with major structures and faults striking in a northeast-southwest direction.

Northwestward transport of the Paleozoic rock sequence along the thrust faults has resulted in the imbricate stacking of large slabs of rock referred to as thrust sheets. Within an individual thrust sheet, smaller faults may splay off the larger thrust fault, resulting in imbricate stacking of rock units within an individual thrust sheet (Osborne and Szabo, 1984). Geologic contacts in this region generally strike parallel to the faults, and repetition of lithologic units is common in vertical sequences. Geologic formations within the Valley and Ridge Province portion of Calhoun County have been mapped by Warman and Causey (1962), Osborne and Szabo (1984), and Moser and DeJarnette (1992) and vary in age from Lower Cambrian to Pennsylvanian.

The basal unit of the sedimentary sequence in Calhoun County is the Cambrian Chilhowee Group. The Chilhowee Group consists of the Cochran, Nichols, Wilson Ridge, and Weisner Formations (Osborne and Szabo, 1984) but in Calhoun County is either undifferentiated or divided into the Cochran and Nichols Formations and an upper, undifferentiated Wilson Ridge and Weisner Formation. The Cochran is composed of poorly sorted arkosic sandstone and conglomerate with interbeds of greenish gray siltstone and mudstone. Massive to laminated greenish gray and black mudstone makes up the Nichols Formation, with thin interbeds of siltstone and very fine-grained sandstone (Osborne et al., 1988). These two formations are mapped only in the eastern part of the county.

The Wilson Ridge and Weisner Formations are undifferentiated in Calhoun County and consist of both coarse-grained and fine-grained clastics. The coarse-grained facies appears to dominate the unit and consists primarily of coarse-grained, vitreous quartzite and friable, fine- to coarse-grained, orthoquartzitic sandstone, both of which locally contain conglomerate. The fine-grained facies consists of sandy and micaceous shale and silty, micaceous mudstone, which are locally interbedded with the coarse clastic rocks. The abundance of orthoquartzitic sandstone and quartzite suggests that most of the Chilhowee Group bedrock in the vicinity of FTMC belongs to the Weisner Formation (Osborne and Szabo, 1984).

The Cambrian Shady Dolomite overlies the Weisner Formation northeast, east, and southwest of the Main Post and consists of interlayered bluish gray or pale yellowish gray sandy dolomitic limestone and siliceous dolomite with coarsely crystalline, porous chert (Osborne et al., 1989). A variegated shale and clayey silt have been included within the lower part of the Shady Dolomite (Cloud, 1966). Material similar to this lower shale unit was noted in core holes drilled by the Alabama Geologic Survey on FTMC (Osborne and Szabo, 1984). The character of the Shady Dolomite in the FTMC vicinity and the true assignment of the shale at this stratigraphic interval are still uncertain (Osborne, 1999).

The Rome Formation overlies the Shady Dolomite and locally occurs to the northwest and southeast of the Main Post, as mapped by Warman and Causey (1962) and Osborne and Szabo (1984), and immediately to the west of Reilly Airfield (Osborne and Szabo, 1984). The Rome Formation consists of variegated, thinly interbedded grayish red-purple mudstone, shale, siltstone, and greenish red and light gray sandstone, with locally occurring limestone and dolomite. Weaver Cave, located approximately 1 mile west of the northwest boundary of the Main Post, is situated in gray dolomite and limestone mapped as the Rome Formation (Osborne et al., 1997). The Conasauga Formation overlies the Rome Formation and occurs along anticlinal axes in the northeastern portion of Pelham Range (Warman and Causey, 1962; Osborne and Szabo, 1984) and the northern portion of the Main Post (Osborne et al., 1997). The Conasauga Formation is composed of dark gray, finely to coarsely crystalline, medium- to thick-bedded dolomite with minor shale and chert (Osborne et al., 1989).

Overlying the Conasauga Formation is the Knox Group, which is composed of the Copper Ridge and Chepultepec dolomites of Cambro-Ordovician age. The Knox Group is undifferentiated in Calhoun County and consists of light medium gray, fine to medium crystalline, variably bedded to laminated, siliceous dolomite and dolomitic limestone that weather to a chert residuum (Osborne and Szabo, 1984). The Knox Group underlies a large portion of the Pelham Range area.

The Ordovician Newala and Little Oak Limestones overlie the Knox Group. The Newala Limestone consists of light to dark gray, micritic, thick-bedded limestone with minor dolomite. The Little Oak Limestone is comprised of dark gray, medium- to thick-bedded, fossiliferous, argillaceous to silty limestone with chert nodules. These limestone units are mapped as undifferentiated at FTMC and in other parts of Calhoun County. The Athens Shale overlies the Ordovician limestone units. The Athens Shale consists of dark gray to black shale and graptolitic shale with localized interbedded dark gray limestone (Osborne et al., 1989). These units occur within an eroded "window" in the uppermost structural thrust sheet at FTMC and underlie much of the developed area of the Main Post.

Other Ordovician-aged bedrock units mapped in Calhoun County include the Greensport Formation, Colvin Mountain Sandstone, and Sequatchie Formation. These units consist of various siltstones, sandstones, shales, dolomites, and limestones and are mapped as one, undifferentiated unit in some areas of Calhoun County. The only Silurian-age sedimentary formation mapped in Calhoun County is the Red Mountain Formation. This unit consists of

interbedded red sandstone, siltstone, and shale with greenish gray to red silty and sandy limestone.

The Devonian Frog Mountain Sandstone consists of sandstone and quartzitic sandstone with shale interbeds, dolomudstone, and glauconitic limestone (Osborne et al., 1988). This unit locally occurs in the western portion of Pelham Range.

The Mississippian Fort Payne Chert and the Maury Formation overlie the Frog Mountain Sandstone and are composed of dark to light gray limestone with abundant chert nodules and greenish gray to grayish red phosphatic shale, with increasing amounts of calcareous chert toward the upper portion of the formation (Osborne and Szabo, 1984). These units occur in the northwestern portion of Pelham Range. Overlying the Fort Payne Chert is the Floyd Shale, also of Mississippian age, which consists of thin-bedded, fissile brown to black shale with thin intercalated limestone layers and interbedded sandstone. Osborne and Szabo (1984) reassigned the Floyd Shale, which was mapped by Warman and Causey (1962) on the Main Post of FTMC, to the Ordovician Athens Shale based on fossil data.

The Pennsylvanian Parkwood Formation overlies the Floyd Shale and consists of a medium to dark gray, silty, clay shale and mudstone with interbedded light to medium gray, very fine to fine grained, argillaceous, micaceous sandstone. Locally the Parkwood Formation also contains beds of medium to dark gray argillaceous, bioclastic to cherty limestone and beds of clayey coal up to a few inches thick (Raymond et., al. 1988). The Parkwood Formation in Calhoun County is generally found within a structurally complex area known as the Coosa deformed belt. In the deformed belt, the Parkwood Formation and Floyd Shale are mapped as undifferentiated because their lithologic similarity and significant deformation make it impractical to map the contact (Thomas and Drahovzal, 1974; Osborne et al., 1988). The undifferentiated Parkwood Formation and Floyd Shale are found throughout the western quarter of Pelham Range.

The Jacksonville thrust fault is the most significant structural geologic feature in the vicinity of the Main Post of FTMC, both for its role in determining the stratigraphic relationships in the area and for its contribution to regional water supplies. The trace of the fault extends northeastward for approximately 39 miles between Bynum, Alabama, and Piedmont, Alabama. The fault is interpreted as a major splay of the Pell City fault (Osborne and Szabo, 1984). The Ordovician sequence that makes up the Eden thrust sheet is exposed at FTMC through an eroded window, or fenster, in the overlying thrust sheet. Rocks within the window display complex folding with overturned, tight to isoclinal folds. The carbonates and shales locally exhibit well-developed

cleavage (Osborne and Szabo, 1984). The FTMC window is framed on the northwest by the Rome Formation; north by the Conasauga Formation; northeast, east, and southwest by the Shady Dolomite; and southeast and southwest by the Chilhowee Group. Two small klippen of the Shady Dolomite, bounded by the Jacksonville fault, have been recognized adjacent to the Pell City fault at the FTMC window (Osborne et al., 1997).

The Pell City fault serves as a fault contact between the bedrock within the FTMC window and the Rome and Conasauga Formations. The trace of the Pell City fault is also exposed approximately nine miles west of the FTMC window on Pelham Range, where it traverses northeast to southwest across the western quarter of Pelham Range. Here, the trace of the Pell City fault marks the boundary between the Pell City thrust sheet and the Coosa deformed belt.

The eastern three-quarters of Pelham Range is located within the Pell City thrust sheet, while the remaining western quarter of Pelham is located within the Coosa deformed belt. The Pell City thrust sheet is a large-scale thrust sheet containing Cambrian and Ordovician rocks and is relatively less structurally complex than the Coosa deformed belt (Thomas and Neathery, 1982). The Pell City thrust sheet is exposed between the traces of the Jacksonville and Pell City faults along the western boundary of the FTMC window and along the trace of the Pell City fault on Pelham Range (Thomas and Neathery, 1982; Osborne et al., 1988). The Coosa deformed belt is a narrow northeast-to-southwest-trending linear zone of complex structure (approximately 5 to 20 miles wide and approximately 90 miles long) consisting mainly of thin imbricate thrust slices. The structure within these imbricate thrust slices is often internally complicated by small-scale folding and additional thrust faults (Thomas and Drahovzal, 1974).

4.3.2 Site Geology

The primary soil type mapped at Parcel 231(7) is the Anniston and Allen gravelly loam. A small portion along the northwestern edge of the parcel is mapped as Anniston gravelly clay loam. The Anniston and Allen gravelly and clay loams have developed in old alluvium on the foot slopes and fans along the base of large hills in the region. The color of the associated surface soil ranges from very dark grayish-brown to dark reddish-gray and dark reddish-brown. The subsoil consists of a dark reddish-gray and dark reddish-brown clay or silty clay loam (U.S. Department of Agriculture, 1961).

The soils encountered during direct push and hollow stem auger drilling activities consisted of a gravelly silty sandy clay, gravelly sandy clayey silt or a gravelly silty sand and clay. The color of soils ranged from light brown to reddish-brown to brown with some yellowish orange, pale

gray and black mottling. The gravel encountered was subrounded to angular and generally consisted of sandstone or quartzite. The soils encountered were generally consistent with the mapped Anniston and Allen gravelly loam and clay loam.

Bedrock beneath the site is mapped as the Cambrian Conasauga Formation, which is associated with the Pell City Thrust Sheet (Osborne et al., 1997). The Jacksonville Thrust Fault is located approximately 200 feet south of the parcel marking the boundary between the Jacksonville and the Pell City Thrust Sheets (Figure 4-1). Bedrock was not encountered during drilling activities at Parcel 231(7).

4.4 Site Hydrology

4.4.1 Surface Hydrology

Precipitation in the form of rainfall averages about 53 inches annually in Anniston, Alabama, with infiltration rates annually exceeding evapotranspiration rates (U.S. Department of Commerce, 1998). The majority of FTMC Main Post including Parcel 231(7) is located within the Cane Creek Drainage Basin. Named tributaries to Cane Creek on the Main Post include Cave Creek, Ingram Creek, Remount Creek, and South Branch of Cane Creek. These waterways flow in a general northwest to westerly direction emptying Cane Creek within the confines of Main Post with the exception of Cave Creek, which occurs as a separate drainage basin on post. Cave Creek joins Cane Creek approximately one mile west of FTMC. Cane Creek then continues in a westerly direction emptying into the Coosa River along the western boundary of Calhoun County.

There are no streams near the Fill Area at Range 30; however, surface water runoff follows topography and flows to the northwest toward Reilly Lake located approximately 2,500 feet away. A seep was noted in the south-central portion of the site. A shallow depression located near the seep fills with water during periods of heavy precipitation.

4.4.2 Hydrogeology

Static groundwater levels were measured in monitoring wells at Parcel 231(7) and in select wells at adjacent parcels on July 26, 2002, as summarized in Table 3-4. A groundwater elevation map was constructed using the July 2002 data, as shown on Figure 4-2. Based on these water level data, groundwater in the vicinity of Parcel 231(7) flows to the west-northwest.

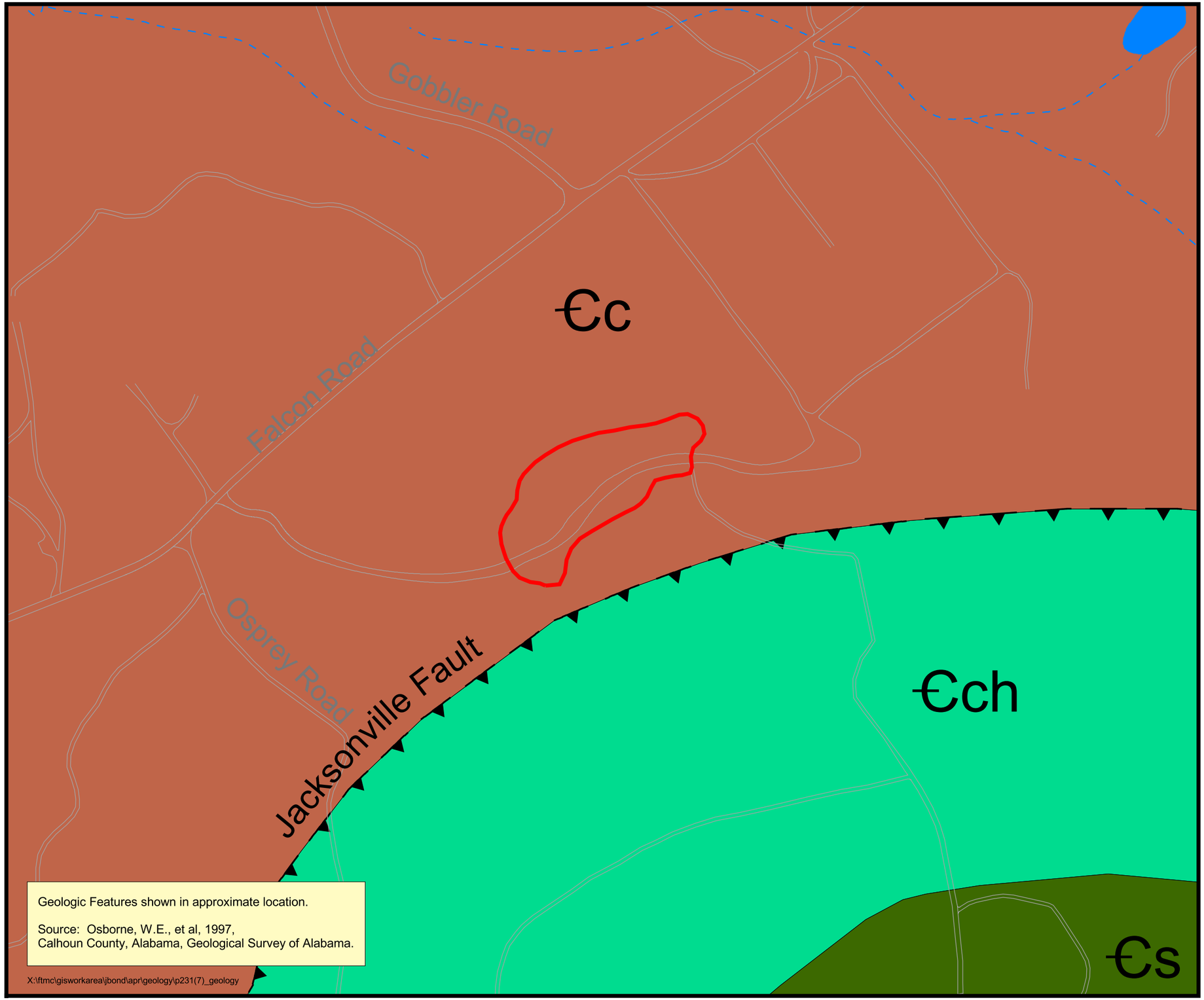


Figure 4-1

Site Geologic Map

Fill Area at Range 30,
Parcel 231(7)
Fort McClellan, Alabama

Legend

- Parcel Boundary
- Surface Water Feature (may be ephemeral)
- Roads
- Streams (dashed where intermittent)

Geology

- Cc — Cambrian - Conasauga Formation
- Cs — Cambrian - Shady Dolomite
- Cch — Cambrian - Chilhowee Group, undifferentiated
- Thrust Fault (dashed where inferred; barbs on upper plate)

300 0 300 Feet

NAD83 State Plane Coordinates

N

Shaw Environmental, Inc.

U.S. Army Corps of Engineers
Mobile District

Contract No. DACA21-96-D-0018

DRAFT. CHCK. BY:
ENGR. CHCK. BY: S. MORAN
INITIATOR: G. SISCO
PROJ. MGR.: J. YACOUB
STARTING DATE: 03/22/04
DRAWN BY: D. BOMAR
DATE LAST REV.:
DRAWN BY:
DWG. NO.: ...\796886es.227
PROJ. NO.: 796886
9/9/2005
9:09:00 AM
dbomar
c:\cadd\design\796886es.227

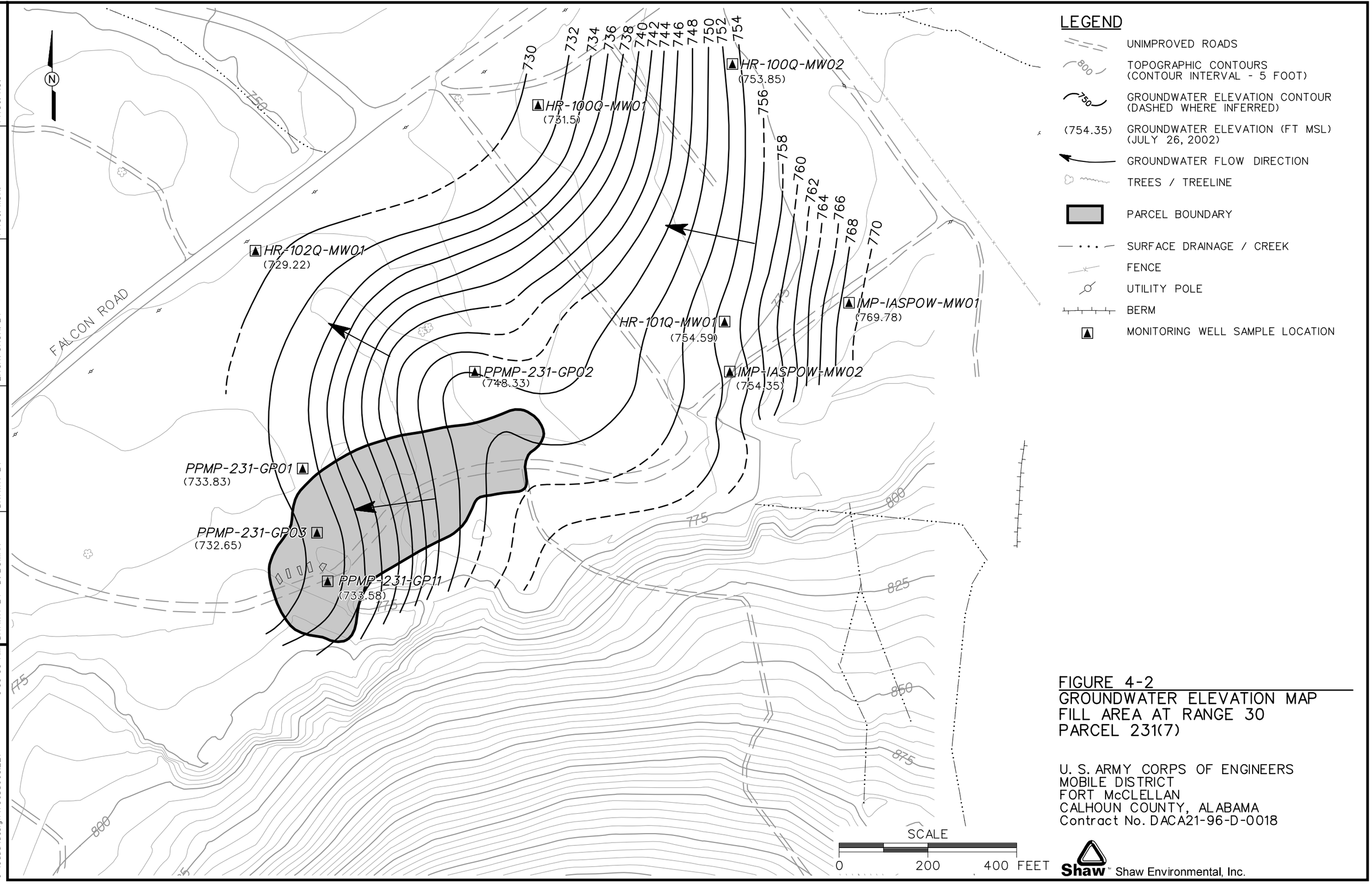


FIGURE 4-2
GROUNDWATER ELEVATION MAP
FILL AREA AT RANGE 30
PARCEL 231(7)

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

Shaw™ Shaw Environmental, Inc.

5.0 Summary of Analytical Results

The results of the chemical analyses of samples collected at the Fill Area at Range 30, Parcel 231(7), indicate that metals, VOCs, SVOCs, and pesticides were detected in site media. To evaluate whether the detected constituents present an unacceptable risk to human health and the environment, the analytical results were compared to SSSLs and ESVs for FTMC. The SSSLs and ESVs were developed by Shaw for human health and ecological risk evaluations as part of the ongoing SIs being performed under the BRAC Environmental Restoration Program at FTMC.

Metals concentrations exceeding the SSSLs and ESVs were subsequently compared to metals background screening values to determine if the metals concentrations are within natural background concentrations (SAIC, 1998). Site metals data were further evaluated using statistical and geochemical methods to determine if the metals were site related (Appendix I). Additionally, PAH concentrations in surface and depositional soils were compared to background screening values developed for FTMC (IT, 2000a).

The following sections and Tables 5-1 through 5-6 summarize the results of the comparison of detected constituents to the SSSLs, ESVs, and background screening values. Complete analytical results are presented in Appendix G.

5.1 Surface and Depositional Soil Analytical Results

Eleven surface soil samples and three depositional soil samples were collected for chemical analysis at the Fill Area at Range 30, Parcel 231(7). Surface and depositional soil samples were collected from the uppermost foot of soil at the locations shown on Figure 3-1. Analytical results were compared to residential human health SSSLs, ESVs, and background screening values, as presented in Table 5-1.

Metals. A total of 22 metals were detected in the surface and depositional soil samples. The concentrations of seven metals (aluminum, arsenic, chromium, iron, manganese, thallium, and vanadium) exceeded their respective SSSLs in one or more samples. However, these metals results were all below background except for arsenic, iron, and vanadium at one sample location (PPMP-231-GP01).

Table 5-1

Surface and Depositional Soil Analytical Results
Fill Area at Range 30, Parcel 231(7)
Fort McClellan, Calhoun County, Alabama

Sample Location					PPMP-231-DEP01					PPMP-231-DEP02					PPMP-231-DEP03					PPMP-231-GP01				
Sample Number					KT0024					KT0030					KT0031					KT0001				
Sample Date					10-Mar-99					25-Mar-99					25-Mar-99					25-Jan-99				
Parameter	Units	BKG[a]	SSSL[b]	ESV[b]	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS																								
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	9.47E+03			YES	YES	4.83E+03				YES	6.75E+03				YES	1.53E+04	J		YES	YES
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	ND					ND					ND					1.10E+00	J			
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	7.40E+00			YES		4.80E+00			YES		3.00E+00			YES		1.45E+01		YES	YES	YES
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	7.77E+01					2.22E+01	J				2.51E+01					8.26E+01				
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	7.80E-01					3.00E-01	J				3.00E-01	J				8.20E-01		YES		
Cadmium	mg/kg	2.90E-01	6.25E+00	1.60E+00	ND					ND					ND					2.90E-01	J	YES		
Calcium	mg/kg	1.72E+03	NA	NA	1.01E+03					4.16E+02	J				2.24E+02	J				7.11E+02				
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	1.47E+01				YES	1.05E+01				YES	5.00E+00				YES	2.72E+01	J		YES	YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	5.50E+00	J				2.70E+00	J				2.80E+00	J				1.01E+01				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	1.47E+01		YES			7.90E+00					2.90E+00	J				2.63E+01		YES		
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	3.06E+04			YES	YES	1.51E+04			YES	YES	8.19E+03			YES	YES	4.47E+04		YES	YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	2.75E+01					3.08E+01					7.80E+00					9.26E+01	J	YES		YES
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	6.92E+02					2.84E+02	J				1.94E+02	J				5.48E+02	J			
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	3.81E+02			YES	YES	2.50E+02				YES	5.71E+02			YES	YES	1.07E+03			YES	YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	6.10E-02					4.60E-02	B				5.00E-02	B				1.40E-01		YES		YES
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	7.90E+00					4.40E+00	J				3.20E+00	J				9.50E+00				
Potassium	mg/kg	8.00E+02	NA	NA	4.72E+02	J				2.58E+02	J				1.62E+02	J				5.01E+02	J			
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	1.50E+00		YES		YES	4.90E-01	J	YES			5.40E-01	J	YES			3.00E-01	J			
Sodium	mg/kg	6.34E+02	NA	NA	1.04E+02	B				6.29E+01	B				2.36E+01	B				3.70E+01	B			
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	ND					ND					ND					1.10E+00	B		YES	YES
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	3.49E+01				YES	2.12E+01				YES	1.43E+01				YES	6.33E+01		YES	YES	YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	2.61E+01					1.48E+01					7.40E+00					3.34E+01	J			
VOLATILE ORGANIC COMPOUNDS																								
1,2,4-Trimethylbenzene	mg/kg	NA	3.88E+02	1.00E-01	ND					ND					ND					ND				
2-Butanone	mg/kg	NA	4.66E+03	8.96E+01	4.60E-03	J				ND					ND					ND				
Acetone	mg/kg	NA	7.76E+02	2.50E+00	4.90E-02	J				ND					ND					ND				
Bromomethane	mg/kg	NA	1.09E+01	NA	ND					ND					ND					1.50E-03	J			
Cumene	mg/kg	NA	7.77E+02	NA	ND					ND					ND					ND				
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	7.40E-03	B				4.80E-03	B				5.10E-03	B				2.20E-03	B			
p-Cymene	mg/kg	NA	1.55E+03	NA	ND					ND					ND					ND				

Table 5-1

Surface and Depositional Soil Analytical Results
Fill Area at Range 30, Parcel 231(7)
Fort McClellan, Calhoun County, Alabama

Sample Location					PPMP-231-DEP01					PPMP-231-DEP02					PPMP-231-DEP03					PPMP-231-GP01				
Sample Number					KT0024					KT0030					KT0031					KT0001				
Sample Date					10-Mar-99					25-Mar-99					25-Mar-99					25-Jan-99				
Parameter	Units	BKG[a]	SSSL[b]	ESV[b]	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
SEMIVOLATILE ORGANIC COMPOUNDS																								
Acenaphthylene	mg/kg	8.91E-01	4.63E+02	6.82E+02	ND					ND					ND					ND				
Anthracene	mg/kg	9.35E-01	2.33E+03	1.00E-01	ND					ND					ND					ND				
Benzo(a)anthracene	mg/kg	1.19E+00	8.51E-01	5.21E+00	ND					ND					ND					ND				
Benzo(a)pyrene	mg/kg	1.42E+00	8.51E-02	1.00E-01	ND					ND					ND					ND				
Benzo(b)fluoranthene	mg/kg	1.66E+00	8.51E-01	5.98E+01	ND					ND					ND					ND				
Benzo(ghi)perylene	mg/kg	9.55E-01	2.32E+02	1.19E+02	ND					ND					ND					ND				
Benzo(k)fluoranthene	mg/kg	1.45E+00	8.51E+00	1.48E+02	ND					ND					ND					ND				
Bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	9.30E-01	ND					ND					ND					ND				
Carbazole	mg/kg	NA	3.11E+01	NA	ND					ND					ND					ND				
Chrysene	mg/kg	1.40E+00	8.61E+01	4.73E+00	ND					ND					ND					ND				
Di-n-butyl phthalate	mg/kg	NA	7.80E+02	2.00E+02	ND					ND					ND					ND				
Dibenz(a,h)anthracene	mg/kg	7.20E-01	8.61E-02	1.84E+01	ND					ND					ND					ND				
Fluoranthene	mg/kg	2.03E+00	3.09E+02	1.00E-01	ND					ND					ND					ND				
Indeno(1,2,3-cd)pyrene	mg/kg	9.37E-01	8.51E-01	1.09E+02	ND					ND					ND					ND				
Phenanthrene	mg/kg	1.08E+00	2.32E+03	1.00E-01	ND					ND					ND					ND				
Pyrene	mg/kg	1.63E+00	2.33E+02	1.00E-01	ND					ND					ND					ND				
PESTICIDES																								
4,4'-DDE	mg/kg	NA	1.79E+00	2.50E-03	ND					ND					ND					ND				
4,4'-DDT	mg/kg	NA	1.79E+00	2.50E-03	ND					ND					ND					ND				
Aldrin	mg/kg	NA	3.65E-02	2.50E-03	ND					ND					ND					ND				
Endosulfan sulfate	mg/kg	NA	4.66E+01	3.58E-02	ND					ND					ND					ND				
Endrin ketone	mg/kg	NA	2.32E-01	1.05E-02	ND					ND					ND					ND				
delta-BHC	mg/kg	NA	2.33E+00	9.94E+00	ND					ND					ND					ND				

Table 5-1

Surface and Depositional Soil Analytical Results
Fill Area at Range 30, Parcel 231(7)
Fort McClellan, Calhoun County, Alabama

Sample Location					PPMP-231-GP02					PPMP-231-GP03					PPMP-231-GP04					PPMP-231-GP05				
Sample Number					KT0003					KT0005					KT0007					KT0009				
Sample Date					1-Feb-99					27-Jan-99					3-Feb-99					10-Feb-99				
Parameter	Units	BKG[a]	SSSL[b]	ESV[b]	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS																								
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	6.24E+03	J			YES	3.91E+03				YES	6.23E+03	J			YES	7.74E+03				YES
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	ND					ND					ND					ND				
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	4.70E+00	J		YES		2.40E+00			YES		6.10E+00	J		YES		5.70E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	5.77E+01	J				9.90E+00	J				4.14E+01	J				2.17E+01	J			
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	3.80E-01	J				1.40E-01	B				4.80E-01	J				2.50E-01	J			
Cadmium	mg/kg	2.90E-01	6.25E+00	1.60E+00	ND					ND					ND					ND				
Calcium	mg/kg	1.72E+03	NA	NA	4.68E+02	J				8.94E+01	J				5.28E+02	J				5.91E+02				
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	7.90E+00	J			YES	9.20E+00				YES	1.00E+01	J			YES	1.49E+01				YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	3.20E+00	J				8.60E-01	J				4.60E+00	J				1.70E+00	J			
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	1.03E+01	J				2.40E+00	J				2.18E+01	J	YES			7.30E+00				
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	1.08E+04	J		YES	YES	8.78E+03			YES	YES	1.84E+04	J		YES	YES	1.91E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	1.51E+01	J				5.50E+00					8.48E+01	J	YES		YES	1.33E+01				
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	1.98E+02	J				1.02E+02	J				2.45E+02	J				6.59E+02				
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	5.98E+02	J		YES	YES	8.10E+01					6.96E+02	J		YES	YES	1.69E+02				YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	6.20E-02					4.00E-02					5.30E-02					3.90E-02				
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	3.20E+00	J				1.40E+00	B				5.70E+00	J				5.00E+00				
Potassium	mg/kg	8.00E+02	NA	NA	1.40E+02	J				1.02E+02	B				2.52E+02	J				ND				
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	6.10E-01	J	YES			ND					7.00E-01	J	YES			6.20E-01		YES		
Sodium	mg/kg	6.34E+02	NA	NA	6.29E+01	B				3.45E+01	B				6.30E+01	B				4.92E+01	B			
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	ND					ND					ND					ND				
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	1.81E+01	J			YES	1.56E+01				YES	2.44E+01	J			YES	3.21E+01				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	4.35E+01	J	YES			5.00E+00					2.18E+01	J				1.40E+01				
VOLATILE ORGANIC COMPOUNDS																								
1,2,4-Trimethylbenzene	mg/kg	NA	3.88E+02	1.00E-01	ND					ND					ND					ND				
2-Butanone	mg/kg	NA	4.66E+03	8.96E+01	ND					ND					ND					ND				
Acetone	mg/kg	NA	7.76E+02	2.50E+00	6.50E-03	B				1.40E-02	J				ND					4.90E-01	J			
Bromomethane	mg/kg	NA	1.09E+01	NA	ND					ND					ND					ND				
Cumene	mg/kg	NA	7.77E+02	NA	ND					ND					ND					ND				
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	3.40E-03	B				3.40E-03	B				3.30E-03	B				1.50E-02	B			
p-Cymene	mg/kg	NA	1.55E+03	NA	ND					ND					ND					ND				

Table 5-1

Surface and Depositional Soil Analytical Results
Fill Area at Range 30, Parcel 231(7)
Fort McClellan, Calhoun County, Alabama

Sample Location					PPMP-231-GP02					PPMP-231-GP03					PPMP-231-GP04					PPMP-231-GP05				
Sample Number					KT0003					KT0005					KT0007					KT0009				
Sample Date					1-Feb-99					27-Jan-99					3-Feb-99					10-Feb-99				
Parameter	Units	BKG[a]	SSSL[b]	ESV[b]	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
SEMIVOLATILE ORGANIC COMPOUNDS																								
Acenaphthylene	mg/kg	8.91E-01	4.63E+02	6.82E+02	ND					ND					ND					ND				
Anthracene	mg/kg	9.35E-01	2.33E+03	1.00E-01	ND					ND					ND					ND				
Benzo(a)anthracene	mg/kg	1.19E+00	8.51E-01	5.21E+00	ND					ND					ND					ND				
Benzo(a)pyrene	mg/kg	1.42E+00	8.51E-02	1.00E-01	ND					ND					ND					ND				
Benzo(b)fluoranthene	mg/kg	1.66E+00	8.51E-01	5.98E+01	ND					ND					ND					ND				
Benzo(ghi)perylene	mg/kg	9.55E-01	2.32E+02	1.19E+02	ND					ND					ND					ND				
Benzo(k)fluoranthene	mg/kg	1.45E+00	8.51E+00	1.48E+02	ND					ND					ND					ND				
Bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	9.30E-01	ND					ND					ND					5.60E-02	B			
Carbazole	mg/kg	NA	3.11E+01	NA	ND					ND					ND					ND				
Chrysene	mg/kg	1.40E+00	8.61E+01	4.73E+00	ND					ND					ND					ND				
Di-n-butyl phthalate	mg/kg	NA	7.80E+02	2.00E+02	ND					ND					6.70E-02	J				ND				
Dibenz(a,h)anthracene	mg/kg	7.20E-01	8.61E-02	1.84E+01	ND					ND					ND					ND				
Fluoranthene	mg/kg	2.03E+00	3.09E+02	1.00E-01	ND					ND					ND					ND				
Indeno(1,2,3-cd)pyrene	mg/kg	9.37E-01	8.51E-01	1.09E+02	ND					ND					ND					ND				
Phenanthrene	mg/kg	1.08E+00	2.32E+03	1.00E-01	ND					ND					ND					ND				
Pyrene	mg/kg	1.63E+00	2.33E+02	1.00E-01	ND					ND					ND					ND				
PESTICIDES																								
4,4'-DDE	mg/kg	NA	1.79E+00	2.50E-03	2.30E-02				YES	ND					ND					ND				
4,4'-DDT	mg/kg	NA	1.79E+00	2.50E-03	1.70E-02				YES	ND					ND					ND				
Aldrin	mg/kg	NA	3.65E-02	2.50E-03	ND					ND					ND					ND				
Endosulfan sulfate	mg/kg	NA	4.66E+01	3.58E-02	ND					ND					ND					ND				
Endrin ketone	mg/kg	NA	2.32E-01	1.05E-02	ND					ND					ND					ND				
delta-BHC	mg/kg	NA	2.33E+00	9.94E+00	ND					ND					ND					ND				

Table 5-1

Surface and Depositional Soil Analytical Results
Fill Area at Range 30, Parcel 231(7)
Fort McClellan, Calhoun County, Alabama

Sample Location					PPMP-231-GP06					PPMP-231-GP07					PPMP-231-GP08					PPMP-231-GP09				
Sample Number					KT0013					KT0016					KT0018					KT0020				
Sample Date					4-Feb-99					4-Feb-99					10-Feb-99					4-Feb-99				
Parameter	Units	BKG[a]	SSSL[b]	ESV[b]	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS																								
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	9.31E+03	J		YES	YES	6.41E+03	J			YES	8.92E+03			YES	YES	4.83E+03	J			YES
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	ND					ND					ND					ND				
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	4.60E+00	J		YES		3.50E+00	J		YES		3.20E+00			YES		4.70E+00	J		YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	8.68E+01	J				5.33E+01	J				7.19E+01					1.92E+01	J			
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	5.40E-01	J				3.80E-01	J				8.40E-01		YES			2.80E-01	B			
Cadmium	mg/kg	2.90E-01	6.25E+00	1.60E+00	ND					ND					ND					ND				
Calcium	mg/kg	1.72E+03	NA	NA	4.20E+02	J				2.35E+02	J				7.64E+03		YES			4.56E+02	J			
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	1.18E+01	J			YES	6.00E+00	J			YES	1.16E+01				YES	1.50E+01	J			YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	6.00E+00	J				3.30E+00	J				1.11E+01					4.40E+00	J			
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	5.10E+00	J				1.31E+01	J	YES			1.53E+01		YES			7.00E+00	J			
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	1.27E+04	J		YES	YES	8.94E+03	J		YES	YES	1.85E+04			YES	YES	1.67E+04	J		YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	1.96E+01	J				6.20E+01	J	YES		YES	3.20E+01					2.10E+01	J			
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	2.65E+02	J				1.62E+02	J				3.31E+03		YES			3.64E+02	J			
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	1.06E+03	J		YES	YES	8.72E+02	J		YES	YES	5.32E+02			YES	YES	2.77E+02	J			YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	5.30E-02					4.70E-02					3.90E-02					3.50E-02	J			
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	4.90E+00	J				3.70E+00	J				1.26E+01		YES			4.10E+00	J			
Potassium	mg/kg	8.00E+02	NA	NA	3.59E+02	J				9.40E+01	J				5.05E+02	J				2.50E+02	J			
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	6.50E-01	J	YES			4.30E-01	J				1.00E+00		YES		YES	7.20E-01	J	YES		
Sodium	mg/kg	6.34E+02	NA	NA	7.27E+01	B				5.06E+01	B				8.81E+01	B				5.38E+01	B			
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	ND					ND					ND					ND				
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	2.22E+01	J			YES	1.63E+01	J			YES	1.84E+01				YES	2.18E+01	J			YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	1.79E+01	J				9.20E+00	J				4.10E+01		YES			1.37E+01	J			
VOLATILE ORGANIC COMPOUNDS																								
1,2,4-Trimethylbenzene	mg/kg	NA	3.88E+02	1.00E-01	4.10E-03	J				ND					ND					ND				
2-Butanone	mg/kg	NA	4.66E+03	8.96E+01	3.40E-03	J				ND					ND					ND				
Acetone	mg/kg	NA	7.76E+02	2.50E+00	9.70E-02	B				9.60E-03	B				1.00E-01	J				ND				
Bromomethane	mg/kg	NA	1.09E+01	NA	ND					ND					ND					ND				
Cumene	mg/kg	NA	7.77E+02	NA	ND					ND					ND					ND				
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	6.50E-03	B				6.20E-03	B				1.80E-02	B				6.10E-03	B			
p-Cymene	mg/kg	NA	1.55E+03	NA	ND					ND					ND					ND				

Table 5-1

Surface and Depositional Soil Analytical Results
Fill Area at Range 30, Parcel 231(7)
Fort McClellan, Calhoun County, Alabama

Sample Location					PPMP-231-GP06					PPMP-231-GP07					PPMP-231-GP08					PPMP-231-GP09				
Sample Number					KT0013					KT0016					KT0018					KT0020				
Sample Date					4-Feb-99					4-Feb-99					10-Feb-99					4-Feb-99				
Parameter	Units	BKG[a]	SSSL[b]	ESV[b]	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
SEMIVOLATILE ORGANIC COMPOUNDS																								
Acenaphthylene	mg/kg	8.91E-01	4.63E+02	6.82E+02	ND					ND					1.90E-01	J				ND				
Anthracene	mg/kg	9.35E-01	2.33E+03	1.00E-01	ND					ND					1.60E-01	J			YES	ND				
Benzo(a)anthracene	mg/kg	1.19E+00	8.51E-01	5.21E+00	ND					ND					1.20E-01	J				ND				
Benzo(a)pyrene	mg/kg	1.42E+00	8.51E-02	1.00E-01	ND					ND					1.80E-01	J		YES	YES	ND				
Benzo(b)fluoranthene	mg/kg	1.66E+00	8.51E-01	5.98E+01	ND					ND					2.00E-01	J				ND				
Benzo(ghi)perylene	mg/kg	9.55E-01	2.32E+02	1.19E+02	ND					ND					2.00E-01	J				ND				
Benzo(k)fluoranthene	mg/kg	1.45E+00	8.51E+00	1.48E+02	ND					ND					1.90E-01	J				ND				
Bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	9.30E-01	1.60E-01	B				1.70E-01	B				4.90E-02	B				1.20E-01	B			
Carbazole	mg/kg	NA	3.11E+01	NA	ND					ND					8.20E-02	J				ND				
Chrysene	mg/kg	1.40E+00	8.61E+01	4.73E+00	ND					ND					1.30E-01	J				ND				
Di-n-butyl phthalate	mg/kg	NA	7.80E+02	2.00E+02	1.20E-01	B				1.40E-01	B				ND					9.70E-02	B			
Dibenz(a,h)anthracene	mg/kg	7.20E-01	8.61E-02	1.84E+01	ND					ND					6.10E-02	J				ND				
Fluoranthene	mg/kg	2.03E+00	3.09E+02	1.00E-01	ND					ND					1.60E-01	J			YES	ND				
Indeno(1,2,3-cd)pyrene	mg/kg	9.37E-01	8.51E-01	1.09E+02	ND					ND					1.50E-01	J				ND				
Phenanthrene	mg/kg	1.08E+00	2.32E+03	1.00E-01	ND					ND					5.50E-02	J				ND				
Pyrene	mg/kg	1.63E+00	2.33E+02	1.00E-01	ND					ND					1.70E-01	J			YES	ND				
PESTICIDES																								
4,4'-DDE	mg/kg	NA	1.79E+00	2.50E-03	ND					ND					1.50E-02	J			YES	ND				
4,4'-DDT	mg/kg	NA	1.79E+00	2.50E-03	ND					ND					3.90E-02				YES	ND				
Aldrin	mg/kg	NA	3.65E-02	2.50E-03	ND					8.20E-04	J				ND					ND				
Endosulfan sulfate	mg/kg	NA	4.66E+01	3.58E-02	ND					1.00E-03	J				ND					ND				
Endrin ketone	mg/kg	NA	2.32E-01	1.05E-02	ND					ND					1.80E-03	J				ND				
delta-BHC	mg/kg	NA	2.33E+00	9.94E+00	ND					ND					2.70E-03	J				ND				

Table 5-1

Surface and Depositional Soil Analytical Results
Fill Area at Range 30, Parcel 231(7)
Fort McClellan, Calhoun County, Alabama

Sample Location					PPMP-231-GP10					PPMP-231-GP11				
Sample Number					KT0021					KT0025				
Sample Date					3-Feb-99					25-Jan-99				
Parameter	Units	BKG[a]	SSSL[b]	ESV[b]	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS														
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	9.02E+03	J		YES	YES	4.00E+03	J			YES
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	ND					2.80E-01	J			
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	5.60E+00	J		YES		6.40E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	3.65E+01	J				1.38E+01	J			
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	3.70E-01	J				1.70E-01	B			
Cadmium	mg/kg	2.90E-01	6.25E+00	1.60E+00	ND					5.00E-02	J			
Calcium	mg/kg	1.72E+03	NA	NA	2.44E+02	J				1.73E+02	J			
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	1.64E+01	J			YES	1.91E+01	J			YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	4.50E+00	J				2.60E+00	J			
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	6.20E+00	J				4.40E+00				
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	1.77E+04	J		YES	YES	1.84E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	2.38E+01	J				1.14E+01	J			
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	2.36E+02	J				9.83E+01	J			
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	6.61E+02	J		YES	YES	1.71E+02				YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	7.50E-02					6.00E-02	J			
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	4.40E+00	J				3.30E+00	J			
Potassium	mg/kg	8.00E+02	NA	NA	2.76E+02	J				1.65E+02	B			
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	7.50E-01	J	YES			2.90E-01	B			
Sodium	mg/kg	6.34E+02	NA	NA	7.19E+01	B				2.00E+01	B			
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	ND					6.70E-01	B		YES	
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	2.89E+01	J			YES	3.39E+01				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	1.29E+01	J				1.10E+01	J			
VOLATILE ORGANIC COMPOUNDS														
1,2,4-Trimethylbenzene	mg/kg	NA	3.88E+02	1.00E-01	ND					ND				
2-Butanone	mg/kg	NA	4.66E+03	8.96E+01	ND					ND				
Acetone	mg/kg	NA	7.76E+02	2.50E+00	2.60E-02	B				1.50E-02	J			
Bromomethane	mg/kg	NA	1.09E+01	NA	ND					ND				
Cumene	mg/kg	NA	7.77E+02	NA	4.20E-03	J				ND				
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	3.90E-03	B				6.90E-03	B			
p-Cymene	mg/kg	NA	1.55E+03	NA	3.90E-03	J				ND				

Table 5-1

Surface and Depositional Soil Analytical Results
Fill Area at Range 30, Parcel 231(7)
Fort McClellan, Calhoun County, Alabama

Sample Location					PPMP-231-GP10					PPMP-231-GP11				
Sample Number					KT0021					KT0025				
Sample Date					3-Feb-99					25-Jan-99				
Parameter	Units	BKG[a]	SSSL[b]	ESV[b]	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
SEMIVOLATILE ORGANIC COMPOUNDS														
Acenaphthylene	mg/kg	8.91E-01	4.63E+02	6.82E+02	ND					ND				
Anthracene	mg/kg	9.35E-01	2.33E+03	1.00E-01	ND					ND				
Benzo(a)anthracene	mg/kg	1.19E+00	8.51E-01	5.21E+00	ND					ND				
Benzo(a)pyrene	mg/kg	1.42E+00	8.51E-02	1.00E-01	ND					ND				
Benzo(b)fluoranthene	mg/kg	1.66E+00	8.51E-01	5.98E+01	ND					ND				
Benzo(ghi)perylene	mg/kg	9.55E-01	2.32E+02	1.19E+02	ND					ND				
Benzo(k)fluoranthene	mg/kg	1.45E+00	8.51E+00	1.48E+02	ND					ND				
Bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	9.30E-01	ND					ND				
Carbazole	mg/kg	NA	3.11E+01	NA	ND					ND				
Chrysene	mg/kg	1.40E+00	8.61E+01	4.73E+00	ND					ND				
Di-n-butyl phthalate	mg/kg	NA	7.80E+02	2.00E+02	ND					ND				
Dibenz(a,h)anthracene	mg/kg	7.20E-01	8.61E-02	1.84E+01	ND					ND				
Fluoranthene	mg/kg	2.03E+00	3.09E+02	1.00E-01	ND					ND				
Indeno(1,2,3-cd)pyrene	mg/kg	9.37E-01	8.51E-01	1.09E+02	ND					ND				
Phenanthrene	mg/kg	1.08E+00	2.32E+03	1.00E-01	ND					ND				
Pyrene	mg/kg	1.63E+00	2.33E+02	1.00E-01	ND					ND				
PESTICIDES														
4,4'-DDE	mg/kg	NA	1.79E+00	2.50E-03	ND					ND				
4,4'-DDT	mg/kg	NA	1.79E+00	2.50E-03	ND					ND				
Aldrin	mg/kg	NA	3.65E-02	2.50E-03	ND					ND				
Endosulfan sulfate	mg/kg	NA	4.66E+01	3.58E-02	ND					ND				
Endrin ketone	mg/kg	NA	2.32E-01	1.05E-02	ND					ND				
delta-BHC	mg/kg	NA	2.33E+00	9.94E+00	ND					ND				

Analyses performed using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods.

[a] BKG - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in SAIC, 1998, *Final Background Metals Survey Report, Fort McClellan, Alabama* , July.
For SVOCs, concentration listed is the background screening value for soils adjacent to asphalt as given in IT, 2000, *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama* , July.

[b] Residential human health site-specific screening level (SSSL) and ecological screening value (ESV) as given in IT, 2000.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit.

J - Compound was positively identified; reported value is an estimated concentration.

mg/kg - Milligrams per kilogram.

NA - Not available.

ND - Not detected.

Table 5-2

Subsurface Soil Analytical Results
Fill Area at Range 30, Parcel 231(7)
Fort McClellan, Calhoun County, Alabama

Sample Location				PPMP-231-GP01				PPMP-231-GP02				PPMP-231-GP03				PPMP-231-GP04			
Sample Number				KT0002				KT0004				KT0006				KT0008			
Sample Date				25-Jan-99				1-Feb-99				27-Jan-99				3-Feb-99			
Sample Depth (Feet)				9-11				10-12				9-11				9-12			
Parameter	Units	BKG[a]	SSSL[b]	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
METALS																			
Aluminum	mg/kg	1.36E+04	7.80E+03	9.12E+03	J		YES	4.44E+03	J			7.08E+03				5.58E+03	J		
Antimony	mg/kg	1.31E+00	3.11E+00	1.80E-01	J			ND				ND				ND			
Arsenic	mg/kg	1.83E+01	4.26E-01	6.40E+00			YES	6.30E+00	J		YES	6.80E+00			YES	4.40E+00	J		YES
Barium	mg/kg	2.34E+02	5.47E+02	3.65E+01				9.40E+00	J			1.75E+01	J			1.24E+01	J		
Beryllium	mg/kg	8.60E-01	9.60E+00	3.90E-01	B			3.50E-01	J			3.00E-01	J			2.80E-01	B		
Cadmium	mg/kg	2.20E-01	6.25E+00	9.00E-02	J			ND				ND				ND			
Calcium	mg/kg	6.37E+02	NA	2.10E+02	J			2.76E+01	J			3.36E+01	J			3.41E+01	J		
Chromium	mg/kg	3.83E+01	2.32E+01	1.19E+01	J			2.94E+01	J		YES	3.06E+01			YES	1.22E+01	J		
Cobalt	mg/kg	1.75E+01	4.68E+02	4.70E+00	J			5.10E+00	J			5.80E+00				1.80E+00	J		
Copper	mg/kg	1.94E+01	3.13E+02	9.40E+00				5.50E+00	J			6.40E+00				4.60E+00	J		
Iron	mg/kg	4.48E+04	2.34E+03	2.31E+04			YES	2.59E+04	J		YES	2.13E+04			YES	1.69E+04	J		YES
Lead	mg/kg	3.85E+01	4.00E+02	1.54E+01	J			1.25E+01	J			9.20E+00				7.70E+00	J		
Magnesium	mg/kg	7.66E+02	NA	2.53E+02	J			7.47E+01	J			1.65E+02	J			1.01E+02	J		
Manganese	mg/kg	1.36E+03	3.63E+02	3.82E+02			YES	1.24E+02	J			3.55E+02				1.31E+02	J		
Mercury	mg/kg	7.00E-02	2.33E+00	6.00E-02	J			3.20E-02	J			5.90E-02				7.50E-02		YES	
Nickel	mg/kg	1.29E+01	1.54E+02	4.20E+00	J			3.40E+00	J			2.90E+00	J			3.10E+00	J		
Potassium	mg/kg	7.11E+02	NA	6.68E+02				1.65E+02	J			3.06E+02	J			3.70E+02	J		
Selenium	mg/kg	4.70E-01	3.91E+01	4.70E-01	J	YES		1.10E+00	J	YES		7.90E-01		YES		7.70E-01	J	YES	
Sodium	mg/kg	7.02E+02	NA	2.86E+01	B			5.69E+01	B			3.44E+01	B			5.98E+01	B		
Thallium	mg/kg	1.40E+00	5.08E-01	7.50E-01	B		YES	ND				ND				ND			
Vanadium	mg/kg	6.49E+01	5.31E+01	3.05E+01				2.31E+01	J			2.94E+01				2.51E+01	J		
Zinc	mg/kg	3.49E+01	2.34E+03	2.50E+01	J			1.04E+01	J			1.00E+01				1.00E+01	J		
VOLATILE ORGANIC COMPOUNDS																			
2-Butanone	mg/kg	NA	4.66E+03	ND				ND				ND				ND			
Acetone	mg/kg	NA	7.76E+02	4.90E-01	J			1.10E-02	B			1.20E-02	J			6.50E-02	B		
Methylene chloride	mg/kg	NA	8.41E+01	5.90E-03	B			3.30E-03	B			3.00E-03	B			3.10E-03	B		
p-Cymene	mg/kg	NA	1.55E+03	1.20E-02				ND				ND				ND			
SEMIVOLATILE ORGANIC COMPOUNDS																			
Bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	ND				ND				ND				ND			
Di-n-butyl phthalate	mg/kg	NA	7.80E+02	ND				ND				5.90E-02	J			ND			
PESTICIDES																			
4,4'-DDT	mg/kg	NA	1.79E+00	ND				3.50E-03				ND				ND			

Table 5-2

Subsurface Soil Analytical Results
Fill Area at Range 30, Parcel 231(7)
Fort McClellan, Calhoun County, Alabama

Sample Location				PPMP-231-GP05				PPMP-231-GP06				PPMP-231-GP07				PPMP-231-GP08			
Sample Number				KT0012				KT0014				KT0017				KT0019			
Sample Date				10-Feb-99				4-Feb-99				4-Feb-99				10-Feb-99			
Sample Depth (Feet)				6-9				9-12				9-12				9-12			
Parameter	Units	BKG[a]	SSSL[b]	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
METALS																			
Aluminum	mg/kg	1.36E+04	7.80E+03	6.75E+03				6.65E+03	J			9.81E+03	J		YES	5.47E+03			
Antimony	mg/kg	1.31E+00	3.11E+00	ND				ND				ND				ND			
Arsenic	mg/kg	1.83E+01	4.26E-01	1.01E+01			YES	4.80E+00	J		YES	8.80E+00	J		YES	6.10E+00			YES
Barium	mg/kg	2.34E+02	5.47E+02	1.30E+01	J			1.57E+01	J			1.50E+01	J			1.22E+01	J		
Beryllium	mg/kg	8.60E-01	9.60E+00	2.60E-01	J			2.70E-01	B			5.40E-01	J			2.50E-01	J		
Cadmium	mg/kg	2.20E-01	6.25E+00	ND				ND				ND				ND			
Calcium	mg/kg	6.37E+02	NA	2.84E+01	B			1.50E+01	J			ND				2.80E+01	B		
Chromium	mg/kg	3.83E+01	2.32E+01	2.18E+01				1.03E+01	J			1.95E+01	J			1.31E+01			
Cobalt	mg/kg	1.75E+01	4.68E+02	6.00E+00				2.70E+00	J			2.80E+00	J			3.80E+00	J		
Copper	mg/kg	1.94E+01	3.13E+02	6.20E+00				5.50E+00	J			1.12E+01	J			5.20E+00			
Iron	mg/kg	4.48E+04	2.34E+03	3.24E+04			YES	1.85E+04	J		YES	3.56E+04	J		YES	2.19E+04			YES
Lead	mg/kg	3.85E+01	4.00E+02	1.97E+01				8.90E+00	J			1.11E+01	J			9.90E+00			
Magnesium	mg/kg	7.66E+02	NA	9.43E+01	J			1.01E+02	J			1.23E+02	J			6.87E+01	J		
Manganese	mg/kg	1.36E+03	3.63E+02	3.02E+02				1.29E+02	J			1.29E+02	J			1.98E+02			
Mercury	mg/kg	7.00E-02	2.33E+00	5.00E-02				5.60E-02				5.60E-02				5.80E-02			
Nickel	mg/kg	1.29E+01	1.54E+02	3.60E+00	J			2.90E+00	J			4.90E+00	J			2.40E+00	J		
Potassium	mg/kg	7.11E+02	NA	1.13E+02	B			3.15E+02	J			4.10E+02	J			1.20E+02	J		
Selenium	mg/kg	4.70E-01	3.91E+01	1.50E+00		YES		6.10E-01	J	YES		1.50E+00	J	YES		9.30E-01		YES	
Sodium	mg/kg	7.02E+02	NA	4.80E+01	B			6.25E+01	B			6.20E+01	B			3.80E+01	B		
Thallium	mg/kg	1.40E+00	5.08E-01	ND				ND				6.60E-01	B		YES	ND			
Vanadium	mg/kg	6.49E+01	5.31E+01	5.08E+01				2.57E+01	J			4.46E+01	J			3.18E+01			
Zinc	mg/kg	3.49E+01	2.34E+03	1.35E+01				1.00E+01	J			1.77E+01	J			9.90E+00			
VOLATILE ORGANIC COMPOUNDS																			
2-Butanone	mg/kg	NA	4.66E+03	4.50E-03	J			ND				ND				ND			
Acetone	mg/kg	NA	7.76E+02	2.50E+00	J			1.00E-02	B			1.50E-02	B			5.40E-02	B		
Methylene chloride	mg/kg	NA	8.41E+01	1.40E-02	B			6.70E-03	B			7.00E-03	B			1.10E-02	B		
p-Cymene	mg/kg	NA	1.55E+03	ND				ND				ND				ND			
SEMIVOLATILE ORGANIC COMPOUNDS																			
Bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	4.90E-02	B			1.50E-01	B			1.50E-01	B			5.10E-02	B		
Di-n-butyl phthalate	mg/kg	NA	7.80E+02	ND				1.20E-01	B			1.20E-01	B			ND			
PESTICIDES																			
4,4'-DDT	mg/kg	NA	1.79E+00	ND				ND				ND				ND			

Table 5-2

Subsurface Soil Analytical Results
Fill Area at Range 30, Parcel 231(7)
Fort McClellan, Calhoun County, Alabama

Sample Location				PPMP-231-GP09				PPMP-231-GP10				PPMP-231-GP11			
Sample Number				KT0029				KT0022				KT0026			
Sample Date				4-Feb-99				3-Feb-99				25-Jan-99			
Sample Depth (Feet)				4-7				9-12				10-12			
Parameter	Units	BKG[a]	SSSL[b]	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
METALS															
Aluminum	mg/kg	1.36E+04	7.80E+03	6.27E+03	J			5.24E+03	J			5.14E+03	J		
Antimony	mg/kg	1.31E+00	3.11E+00	ND				ND				4.70E-01	J		
Arsenic	mg/kg	1.83E+01	4.26E-01	5.10E+00	J		YES	4.60E+00	J		YES	7.60E+00			YES
Barium	mg/kg	2.34E+02	5.47E+02	1.32E+01	J			1.60E+01	J			1.83E+01	J		
Beryllium	mg/kg	8.60E-01	9.60E+00	2.10E-01	B			3.10E-01	J			2.10E-01	B		
Cadmium	mg/kg	2.20E-01	6.25E+00	ND				ND				9.00E-02	J		
Calcium	mg/kg	6.37E+02	NA	9.60E+01	J			1.65E+01	J			8.19E+01	J		
Chromium	mg/kg	3.83E+01	2.32E+01	9.50E+00	J			2.14E+01	J			2.34E+01	J		YES
Cobalt	mg/kg	1.75E+01	4.68E+02	7.20E+00	J			1.80E+00	J			5.60E+00	J		
Copper	mg/kg	1.94E+01	3.13E+02	4.70E+00	J			5.40E+00	J			5.30E+00			
Iron	mg/kg	4.48E+04	2.34E+03	1.76E+04	J		YES	1.88E+04	J		YES	2.71E+04			YES
Lead	mg/kg	3.85E+01	4.00E+02	8.90E+00	J			6.20E+00	J			1.37E+01	J		
Magnesium	mg/kg	7.66E+02	NA	1.25E+02	J			8.96E+01	J			1.04E+02	J		
Manganese	mg/kg	1.36E+03	3.63E+02	2.50E+02	J			1.09E+02	J			2.91E+02			
Mercury	mg/kg	7.00E-02	2.33E+00	5.50E-02				3.10E-02	J			1.40E-01		YES	
Nickel	mg/kg	1.29E+01	1.54E+02	2.50E+00	J			2.80E+00	J			3.10E+00	B		
Potassium	mg/kg	7.11E+02	NA	1.44E+02	J			5.17E+02	J			2.06E+02	B		
Selenium	mg/kg	4.70E-01	3.91E+01	8.60E-01	J	YES		8.40E-01	J	YES		ND			
Sodium	mg/kg	7.02E+02	NA	6.28E+01	B			5.54E+01	B			3.01E+01	B		
Thallium	mg/kg	1.40E+00	5.08E-01	ND				ND				6.40E-01	B		YES
Vanadium	mg/kg	6.49E+01	5.31E+01	2.68E+01	J			2.50E+01	J			4.69E+01			
Zinc	mg/kg	3.49E+01	2.34E+03	8.20E+00	J			9.50E+00	J			1.23E+01	J		
VOLATILE ORGANIC COMPOUNDS															
2-Butanone	mg/kg	NA	4.66E+03	ND				ND				ND			
Acetone	mg/kg	NA	7.76E+02	6.10E-03	B			7.80E-03	B			1.10E-02	J		
Methylene chloride	mg/kg	NA	8.41E+01	6.10E-03	B			3.30E-03	B			9.00E-03	B		
p-Cymene	mg/kg	NA	1.55E+03	ND				ND				ND			
SEMIVOLATILE ORGANIC COMPOUNDS															
Bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	1.50E-01	B			ND				ND			
Di-n-butyl phthalate	mg/kg	NA	7.80E+02	1.10E-01	B			ND				ND			
PESTICIDES															
4,4'-DDT	mg/kg	NA	1.79E+00	ND				ND				ND			

Table 5-2

Subsurface Soil Analytical Results
Fill Area at Range 30, Parcel 231(7)
Fort McClellan, Calhoun County, Alabama

Analyses performed using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods.

[a] BKG - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in SAIC, 1998, *Final Background Metals Survey Report, Fort McClellan, Alabama*, July.

[b] Residential human health site-specific screening level (SSSL) as given in IT, 2000, *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama*, July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit.

J - Compound was positively identified; reported value is an estimated concentration.

mg/kg - Milligrams per kilogram.

NA - Not available.

ND - Not detected.

Qual - Data validation qualifier.

Table 5-3

Groundwater Analytical Results
Fill Area at Range 30, Parcel 231(7)
Fort McClellan, Calhoun County, Alabama

Sample Location				PPMP-231-GP01				PPMP-231-GP02				PPMP-231-GP03				PPMP-231-GP11			
Sample Number				KT3001				KT3002				KT3005				KT3006			
Sample Date				7-Apr-99				8-Apr-99				7-Apr-99				7-Apr-99			
Parameter	Units	BKG[a]	SSSL[b]	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
METALS																			
Aluminum	mg/L	2.34E+00	1.56E+00	2.96E+01		YES	YES	1.28E-01	B			4.11E-01				3.01E-02	B		
Arsenic	mg/L	1.78E-02	4.46E-05	3.03E-02		YES	YES	ND				ND				ND			
Barium	mg/L	1.27E-01	1.10E-01	1.15E-01	J		YES	6.50E-02	J			1.31E-02	J			9.30E-03	J		
Beryllium	mg/L	1.25E-03	3.13E-03	1.80E-03	J	YES		ND				ND				ND			
Calcium	mg/L	5.65E+01	NA	2.34E+00	J			1.22E+00	J			8.55E-01	B			7.67E-01	B		
Chromium	mg/L	NA	4.69E-03	5.80E-02	J		YES	ND				ND				ND			
Cobalt	mg/L	2.34E-02	9.39E-02	3.06E-02	J	YES		5.70E-03	B			ND				ND			
Copper	mg/L	2.55E-02	6.26E-02	3.41E-02		YES		ND				ND				ND			
Iron	mg/L	7.04E+00	4.69E-01	7.48E+01		YES	YES	1.19E-01	B			3.48E-01				5.36E-02	B		
Lead	mg/L	8.00E-03	1.50E-02	1.26E-01		YES	YES	ND				ND				ND			
Magnesium	mg/L	2.13E+01	NA	2.49E+00	J			4.29E-01	J			3.20E-01	B			3.48E-01	B		
Manganese	mg/L	5.81E-01	7.35E-02	1.82E+00		YES	YES	2.63E-01			YES	6.38E-02				4.92E-02			
Mercury	mg/L	NA	4.69E-04	1.30E-04	B			ND				ND				ND			
Nickel	mg/L	NA	3.13E-02	4.44E-02			YES	ND				ND				ND			
Potassium	mg/L	7.20E+00	NA	5.24E+00				ND				ND				ND			
Sodium	mg/L	1.48E+01	NA	1.02E+00	B			1.66E+00	B			3.30E+00	B			9.20E-01	B		
Thallium	mg/L	1.46E-03	1.02E-04	5.30E-03	B	YES	YES	ND				ND				ND			
Vanadium	mg/L	1.70E-02	1.10E-02	1.20E-01		YES	YES	ND				ND				ND			
Zinc	mg/L	2.20E-01	4.69E-01	1.86E-01	J			ND				ND				ND			
VOLATILE ORGANIC COMPOUNDS																			
Acetone	mg/L	NA	1.56E-01	1.20E-03	B			2.70E-03	B			3.60E-03	B			2.60E-03	B		
Carbon disulfide	mg/L	NA	1.51E-01	ND				ND				1.40E-04	J			ND			
Chloroform	mg/L	NA	1.15E-03	ND				ND				2.30E-04	J			ND			
SEMIVOLATILE ORGANIC COMPOUNDS																			
Bis(2-Ethylhexyl)phthalate	mg/L	NA	4.31E-03	3.80E-03	B			ND				1.80E-03	B			ND			

Analyses performed using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods.

[a] BKG - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in SAIC, 1998, *Final Background Metals Survey Report, Fort McClellan, Alabama* , July.

[b] Residential human health site-specific screening level (SSSL) as given in IT, 2000, *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama* , July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit.

J - Compound was positively identified; reported value is an estimated concentration.

mg/L - Milligrams per liter.

NA - Not available.

ND - Not detected.

Qual - Data validation qualifier.

Table 5-4

Surface/Seep Water Analytical Results
Fill Area at Range 30, Parcel 231(7)
Fort McClellan, Calhoun County, Alabama

Sample Location					PPMP-231-SEP01					PPMP-231-SW/SD01				
Sample Number					KT2001					KT2004				
Sample Date					8-Feb-99					10-Mar-99				
Parameter	Units	BKG[a]	SSSL[b]	ESV[b]	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS														
Aluminum	mg/L	5.26E+00	1.53E+01	8.70E-02	4.26E-01				YES	3.44E-01				YES
Barium	mg/L	7.54E-02	1.10E+00	3.90E-03	8.52E-02	J	YES		YES	7.00E-03	J			YES
Calcium	mg/L	2.52E+01	NA	1.16E+02	6.25E+01		YES			2.47E-01	J			
Iron	mg/L	1.96E+01	4.70E+00	1.00E+00	7.12E-01					2.63E-01				
Lead	mg/L	8.67E-03	1.50E-02	1.32E-03	3.20E-03				YES	ND				
Magnesium	mg/L	1.10E+01	NA	8.20E+01	1.74E+01		YES			1.84E-01	J			
Manganese	mg/L	5.65E-01	6.40E-01	8.00E-02	2.77E-02					4.21E-02				
Potassium	mg/L	2.56E+00	NA	5.30E+01	1.09E+00	J				ND				
Sodium	mg/L	3.44E+00	NA	6.80E+02	9.79E-01	B				1.08E+00	B			
VOLATILE ORGANIC COMPOUNDS														
Acetone	mg/L	NA	1.57E+00	7.80E+01	ND					2.50E-03	J			
SEMIVOLATILE ORGANIC COMPOUNDS														
Bis(2-Ethylhexyl)phthalate	mg/L	NA	5.17E-02	3.00E-04	3.00E-03	B			YES	ND				

Analyses performed using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods.

[a] BKG - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in SAIC, 1998, *Final Background Metals Survey Report, Fort McClellan, Alabama*, July.

[b] Recreational site user site-specific screening level (SSSL) and ecological screening value (ESV) as given in IT, 2000, *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama,* July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit.

J - Compound was positively identified; reported value is an estimated concentration.

mg/L - Milligrams per liter.

NA - Not available.

ND - Not detected.

Qual - Data validation qualifier.

Table 5-5

Sediment Analytical Results
Fill Area at Range 30, Parcel 231(7)
Fort McClellan, Calhoun County, Alabama

Sample Location Sample Number Sample Date					PPMP-231-SW/SD01 KT1001 10-Mar-99				
Parameter	Units	BKG[a]	SSSL[b]	ESV[b]	Result	Qual	>BKG	>SSSL	>ESV
METALS									
Aluminum	mg/kg	8.59E+03	1.15E+06	NA	3.81E+03				
Arsenic	mg/kg	1.13E+01	5.58E+01	7.24E+00	3.70E+00				
Barium	mg/kg	9.89E+01	8.36E+04	NA	8.40E+00	J			
Beryllium	mg/kg	9.70E-01	1.50E+02	NA	1.30E-01	J			
Calcium	mg/kg	1.11E+03	NA	NA	1.98E+01	B			
Chromium	mg/kg	3.12E+01	2.79E+03	5.23E+01	1.20E+01				
Cobalt	mg/kg	1.10E+01	6.72E+04	5.00E+01	1.30E+00	J			
Copper	mg/kg	1.71E+01	4.74E+04	1.87E+01	1.70E+00	J			
Iron	mg/kg	3.53E+04	3.59E+05	NA	1.07E+04				
Lead	mg/kg	3.78E+01	4.00E+02	3.02E+01	4.20E+00				
Magnesium	mg/kg	9.06E+02	NA	NA	4.47E+01	J			
Manganese	mg/kg	7.12E+02	4.38E+04	NA	1.51E+02				
Mercury	mg/kg	1.10E-01	2.99E+02	1.30E-01	4.20E-02	B			
Selenium	mg/kg	7.20E-01	5.96E+03	NA	5.10E-01	J			
Sodium	mg/kg	6.92E+02	NA	NA	8.65E+01	B			
Vanadium	mg/kg	4.09E+01	4.83E+03	NA	2.23E+01				
Zinc	mg/kg	5.27E+01	3.44E+05	1.24E+02	2.60E+00				
TOTAL ORGANIC CARBON									
Total Organic Carbon	mg/kg	NA	NA	NA	4.71E+02				
VOLATILE ORGANIC COMPOUNDS									
Methylene chloride	mg/kg	NA	9.84E+03	1.26E+00	4.60E-03	B			

Analyses performed using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods.

[a] BKG - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in SAIC, 1998, *Final Background Metals Survey Report, Fort McClellan, Alabama*, July.

[b] Recreational site user site-specific screening level (SSSL) and ecological screening value (ESV) as given in IT, 2000, *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama,* July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit.

J - Compound was positively identified; reported value is an estimated concentration.

mg/kg - Milligrams per kilogram.

NA - Not available.

ND - Not detected.

Qual - Data validation qualifier.

Table 5-6

Fill Material Soil Analytical Results
Fill Area at Range 30, Parcel 231(7)
Fort McClellan, Calhoun County, Alabama

Sample Location			FA-231-SB01			FA-231-SB02		
Sample Number			DD0021			DD0022		
Sample Date			30-Mar-00			30-Mar-00		
Sample Depth (Feet)			2 - 4			0 - 2		
Parameter	Units	BKG[a]	Result	Qual	>BKG	Result	Qual	>BKG
METALS								
Aluminum	mg/kg	1.36E+04	1.08E+04			1.00E+04		
Arsenic	mg/kg	1.83E+01	6.70E+00			6.20E+00		
Barium	mg/kg	2.34E+02	8.70E+01			8.16E+01		
Beryllium	mg/kg	8.60E-01	6.50E-01			7.00E-01		
Calcium	mg/kg	6.37E+02	8.93E+03		YES	8.46E+03	J	YES
Chromium	mg/kg	3.83E+01	1.38E+01			1.30E+01		
Cobalt	mg/kg	1.75E+01	5.30E+00	J		7.20E+00		
Copper	mg/kg	1.94E+01	2.53E+01		YES	2.45E+01		YES
Iron	mg/kg	4.48E+04	2.68E+04			2.19E+04		
Lead	mg/kg	3.85E+01	1.64E+01			3.94E+01		YES
Magnesium	mg/kg	7.66E+02	1.25E+03		YES	5.14E+03	J	YES
Manganese	mg/kg	1.36E+03	1.13E+02			5.97E+02		
Mercury	mg/kg	7.00E-02	2.30E-02	J		5.50E-02		
Nickel	mg/kg	1.29E+01	1.22E+01			1.57E+01		YES
Potassium	mg/kg	7.11E+02	4.66E+02	J		3.32E+02	J	
Thallium	mg/kg	1.40E+00	7.80E-01	J		7.80E-01	J	
Vanadium	mg/kg	6.49E+01	3.01E+01			2.20E+01		
Zinc	mg/kg	3.49E+01	3.64E+01		YES	5.19E+01		YES
VOLATILE ORGANIC COMPOUNDS								
Acetone	mg/kg	NA	ND			2.80E-01	J	
Methylene chloride	mg/kg	NA	3.20E-03	B		3.10E-03	B	
SEMIVOLATILE ORGANIC COMPOUNDS								
Bis(2-Ethylhexyl)phthalate	mg/kg	NA	8.50E-02	B		9.10E-02	B	
PESTICIDES								
4,4'-DDE	mg/kg	NA	8.10E-04	J		1.00E-03	J	
4,4'-DDT	mg/kg	NA	6.60E-04	J		3.10E-03		

Analyses performed using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods.

[a] BKG - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in SAIC, 1998, *Final Background Metals Survey Report, Fort McClellan, Alabama* , July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit.

J - Compound was positively identified; reported value is an estimated concentration.

mg/kg - Milligrams per kilogram.

NA - Not available.

ND - Not detected.

Qual - Data validation qualifier.

The concentrations of ten metals exceeded ESVs: aluminum, arsenic, chromium, iron, lead, manganese, mercury, selenium, thallium, and vanadium. These metals results were below background except for the following:

- Arsenic (14.5 milligrams per kilogram [mg/kg]) exceeded its ESV (10 mg/kg) and background (13.7 mg/kg) at one sample location (PPMP-231-GP01).
- Iron (44,700 mg/kg) exceeded its ESV (200 mg/kg) and background (34,154 mg/kg) at one sample location (PPMP-231-GP01).
- Lead (62 to 92.6 mg/kg) exceeded its ESV (50 mg/kg) and background (40 mg/kg) at three sample locations (PPMP-231-GP01, PPMP-231-GP04, and PPMP-231-GP07).
- Mercury (0.14 mg/kg) exceeded its ESV (0.1 mg/kg) and background (0.08 mg/kg) at one sample location (PPMP-231-GP01).
- Selenium (1 and 1.5 mg/kg) exceeded its ESV (0.81 mg/kg) and background (0.48 mg/kg) at two sample locations (PPMP-231-DEP01 and PPMP-231-GP08).
- Vanadium (63.3 mg/kg) exceeded its ESV (2 mg/kg) and background (58.8 mg/kg) at one sample location (PPMP-231-GP01).

Volatile Organic Compounds. A total of seven VOCs (1,2,4-trimethylbenzene, 2-butanone, acetone, bromomethane, cumene, methylene chloride, and p-cymene) were detected in the surface and depositional soil samples. All of the methylene chloride results and four acetone results were flagged with a "B" data qualifier, indicating that these compounds were also detected in an associated laboratory or field blank sample. The remaining VOC results were flagged with a "J" data qualifier, indicating that the compounds were positively identified but the concentrations were estimated. VOC concentrations in the samples ranged from 0.0015 to 0.49 mg/kg and were all below SSSLs and ESVs. ESVs were not available for bromomethane, cumene, and p-cymene, which were detected at low estimated concentrations in only one sample each.

Semivolatile Organic Compounds. A total of 16 SVOCs, including 13 PAH compounds, were detected in the surface and depositional soil samples (Table 5-1). All of the bis(2-ethylhexyl)phthalate results and most of the di-n-butyl phthalate results were flagged with a "B" data qualifier, indicating that these compounds were also detected in an associated laboratory or field blank sample. The remaining SVOC results were flagged with a "J" data qualifier, indicating that the compounds were positively identified but the concentrations were estimated.

SVOC concentrations in the samples ranged from 0.049 to 0.2 mg/kg and were all below SSSLs, except for benzo(a)pyrene (0.18 mg/kg), which exceeded its SSSL (0.085 mg/kg) in one sample (location PPMP-231-GP08). However, the benzo(a)pyrene result was below its background value.

The concentrations of four PAHs (anthracene, benzo[a]pyrene, fluoranthene, and pyrene), 0.16 to 0.18 mg/kg, exceeded their respective ESVs (0.1 mg/kg for each compound) at sample location PPMP-231-GP08. However, these PAH results were below background values.

Pesticides. A total of six pesticides (4,4'-DDE, 4,4'-DDT, aldrin, delta-BHC, endosulfan sulfate, and endrin ketone) were detected in three of the surface and depositional soil samples. The pesticide concentrations in the samples ranged from 0.00082 to 0.039 mg/kg and were all below SSSLs.

The 4,4'-DDE and 4,4'-DDT results (0.015 to 0.039 mg/kg) exceeded their respective ESVs (0.0025 mg/kg for each compound) in two samples each (locations PPMP-231-GP02 and PPMP-231-GP08).

Herbicides. Herbicides were not detected in the surface and depositional soil samples.

Explosives. Explosive compounds were not detected in the surface and depositional soil samples.

Polychlorinated Biphenyls. PCBs were not detected in the surface and depositional soil samples.

5.2 Subsurface Soil Analytical Results

Eleven subsurface soil samples were collected for chemical analysis at the Fill Area at Range 30, Parcel 231(7). Subsurface soil samples were collected at depths ranging from 4 to 12 feet bgs at the locations shown on Figure 3-1. Analytical results were compared to residential human health SSSLs and metals background concentrations, as presented in Table 5-2.

Metals. A total of 22 metals were detected in the subsurface soil samples. The concentrations of six metals (aluminum, arsenic, chromium, iron, manganese, and thallium) exceeded their respective SSSLs. However, these metals results were all below background.

Volatile Organic Compounds. A total of four VOCs (2-butanone, acetone, methylene chloride, and p-cymene) were detected in the subsurface soil samples. The majority of the results were flagged with a "B" data qualifier, indicating that these compounds were also detected in an associated laboratory or field blank sample. VOC concentrations in the samples ranged from 0.003 to 2.5 mg/kg and were all below SSSLs.

Semivolatile Organic Compounds. Two SVOCs (bis[2-ethylhexyl]phthalate and di-n-butyl phthalate) were detected in the subsurface soil samples. All but one of the results were flagged with a "B" data qualifier, indicating that these compounds were also detected in an associated laboratory or field blank sample. The remaining SVOC result (0.059 mg/kg) was flagged with a "J" data qualifier, indicating that the concentration was an estimated value. SVOC concentrations in the samples ranged from 0.049 to 0.15 mg/kg and were all below SSSLs.

Pesticides. One pesticide (4,4'-DDT) was detected in one subsurface soil sample (location PPMP-231-GP02) at a concentration (0.0035 mg/kg) below its SSSL (1.79 mg/kg).

Herbicides. Herbicides were not detected in the subsurface soil samples.

Explosives. Explosive compounds were not detected in the subsurface soil samples.

Polychlorinated Biphenyls. PCBs were not detected in the subsurface soil samples.

5.3 Groundwater Analytical Results

Four groundwater samples were collected for chemical analysis at the Fill Area at Range 30, Parcel 231(7), at the locations shown on Figure 3-1. Analytical results were compared to residential human health SSSLs and metals background concentrations, as presented in Table 5-3.

Metals. A total of 19 metals were detected in the groundwater samples. The concentrations of ten metals exceeded SSSLs almost exclusively at sample location PPMP-231-GP01. Of these, seven metals (aluminum, arsenic, iron, lead, manganese, thallium, and vanadium) also exceeded their respective background concentrations in the sample collected at PPMP-231-GP01. It should be noted that the sample collected at PPMP-231-GP01 was very turbid (greater than 1,000 nephelometric turbidity units) at the time of sample collection. High turbidity has been shown to cause elevated metals results in groundwater samples at FTMC (IT, 2000b).

To further address elevated metals in groundwater from PPMP-231-GP01, the concentrations of metals were evaluated from two other site wells (PPMP-231-GP03 and PPMP-231-GP11) that were also located in a downgradient position to the parcel. Neither of these wells had concentrations of any metals in groundwater above background or SSSLs.

Volatile Organic Compounds. A total of three VOCs (acetone, carbon disulfide, and chloroform) were detected in the groundwater samples. Acetone was detected in each of the samples; however, all of the results were "B" qualified, indicating that acetone was also detected in an associated laboratory or field blank sample. Carbon disulfide and chloroform were detected at estimated concentrations in only one sample. All VOC results were below SSSLs.

Semivolatile Organic Compounds. One SVOC (bis[2-ethylhexyl]phthalate) was detected in two groundwater samples at concentrations below its SSSL. Both results were "B" qualified, indicating that the compound was also detected in an associated laboratory or field blank sample.

Pesticides. Pesticides were not detected in the groundwater samples.

Herbicides. Herbicides were not detected in the groundwater samples.

Explosives. Explosive compounds were not detected in the groundwater samples.

Polychlorinated Biphenyls. PCBs were not detected in the groundwater samples.

5.4 Surface/Seep Water Analytical Results

One surface water sample and one seep water sample were collected for chemical analysis at the Fill Area at Range 30, Parcel 231(7), at the locations shown on Figure 3-1. Analytical results were compared to recreational site user SSSLs, ESVs, and metals background concentrations, as presented in Table 5-4. It should be noted that the assumptions for residential and recreational site user exposure to surface/seep water are identical.

Metals. A total of nine metals were detected in the surface/seep water samples at concentrations below SSSLs. The concentrations of three metals (aluminum, barium, and lead) exceeded ESVs but were below background except for barium in one sample. Barium was detected at an estimated concentration (0.085 milligrams per liter [mg/L]) exceeding its ESV (0.0039 mg/L) and background (0.075 mg/L) at sample location PPMP-231-SEP01.

Volatile Organic Compounds. Acetone was the only VOC detected in the surface/seep water samples. The estimated result was below the SSSL and ESV.

Semivolatile Organic Compounds. Bis(2-ethylhexyl)phthalate was the only SVOC detected in the surface/seep water samples. The concentration was below the SSSL but exceeded the ESV. However, the analytical result was "B" qualified, indicating that the compound was also detected in an associated laboratory or field blank sample. Bis(2-ethylhexyl)phthalate is a common field and laboratory sample contaminant.

Pesticides. Pesticides were not detected in the surface/seep water samples.

Herbicides. Herbicides were not detected in the surface/seep water samples.

Explosives. Explosive compounds were not detected in the surface/seep water samples.

Polychlorinated Biphenyls. PCBs were not detected in the surface/seep water samples.

5.5 Sediment Analytical Results

One sediment sample was collected at the Fill Area at Range 30, Parcel 231(7), at the location shown on Figure 3-1. Analytical results were compared to recreational site user SSSLs, ESVs, and metals background concentrations, as presented in Table 5-5. It should be noted that the assumptions for residential and recreational site user exposure to sediment are identical.

Metals. Seventeen metals were detected in the sediment sample (Table 5-5). All results were below SSSLs, ESVs, and background, where available.

Volatile Organic Compounds. One VOC (methylene chloride) was detected in the sample at a concentration below its SSSL and ESV.

Semivolatile Organic Compounds. SVOCs were not detected in the sediment sample.

Pesticides. Pesticides were not detected in the sediment sample.

Herbicides. Herbicides were not detected in the sediment sample.

Explosives. Explosive compounds were not detected in the sediment sample.

Polychlorinated Biphenyls. PCBs were not detected in the sediment sample.

Total Organic Carbon. The TOC concentration in the sediment sample was 471 mg/kg.

Grain Size. The grain size results for the sediment sample are presented in Appendix G.

5.6 Fill Material Soil Analytical Results

Two fill material soil samples were collected for chemical analysis at Parcel 231(7). Fill material samples were collected at depths of 0 to 4 feet bgs at the locations shown on Figure 3-1. The analytical results were compared to background screening values, where available, as presented in Table 5-6.

Metals. Eighteen metals were detected in the fill material soil samples. The concentrations of six metals (calcium, copper, lead, magnesium, nickel, and zinc) exceeded their respective background values in one or both samples.

Volatile Organic Compounds. Two VOCs (acetone and methylene chloride) were detected in the fill material soil samples at concentrations ranging from 0.0031 to 0.28 mg/kg.

Semivolatile Organic Compounds. Bis(2-ethylhexyl)phthalate was the only SVOC detected in the fill material soil samples. The analytical results were "B" qualified, indicating that the compound was also detected in an associated laboratory or field blank sample. Bis(2-ethylhexyl)phthalate is a common field and laboratory sample contaminant.

Pesticides. Two pesticides (4,4'-DDE and 4,4'-DDT) were detected in the fill material soil samples at concentrations ranging from 0.00066 to 0.0031 mg/kg.

Herbicides. Herbicides were not detected in the fill material soil samples.

Explosives. Explosive compounds were not detected in the fill material soil samples.

Polychlorinated Biphenyls. PCBs were not detected in the fill material soil samples.

5.7 Statistical and Geochemical Evaluations of Site Metals Data

Site metals data (excluding the fill material soil sample data) were further evaluated using statistical and geochemical methods to determine if the metals are site-related. This multi-tiered approach is described in the technical memorandum "Selecting Site-Related Chemicals for Human Health and Ecological Risk Assessments for FTMC: Revision 2" (Shaw, 2003b). The statistical and geochemical evaluations determined that the metals detected in site media are present at naturally occurring levels (Appendix I).

6.0 Summary, Conclusions, and Recommendations

Shaw completed an SI at the Fill Area at Range 30, Parcel 231(7), at FTMC in Calhoun County, Alabama. The SI was conducted to determine whether chemical constituents are present at the site as a result of historical mission-related Army activities. The SI consisted of the collection and analysis of eleven surface soil samples, three depositional soil samples, eleven subsurface soil samples, four groundwater samples, one sediment sample, one surface water sample, and one seep sample. Four temporary monitoring wells were installed at the site to facilitate groundwater sample collection and to provide site-specific geological and hydrogeological characterization information. Fill area definition activities, consisting of exploratory trenching and soil boring installation, were also performed to define the horizontal and vertical extent of fill and to characterize its contents. Additional site-related activities included a wetland determination and the removal of asphalt debris from the surface of the fill area.

Based on the fill area definition activities, the horizontal extent of the fill area is estimated to be approximately 3.9 acres. The average depth of fill material is approximately 4 feet below ground surface. The wetland study determined that jurisdictional wetlands do not exist on, or within 200 feet, of the Parcel 231(7) boundary. The site clean-up activity removed approximately 15 cubic yards of asphalt debris from the surface of the fill area.

Chemical analysis of samples collected at the site indicates that metals, VOCs, SVOCs, and pesticides were detected in site media. To evaluate whether the detected constituents pose an unacceptable risk to human health or the environment, the analytical results were compared to SSSLs, ESVs, and background screening values for FTMC. In addition, site metals data were evaluated using statistical and geochemical methods to determine if the metals in site media were naturally occurring.

Various metals (aluminum, arsenic, iron, lead, manganese, thallium, and vanadium) were detected in site media at concentrations exceeding SSSLs and background and, thus, were selected as COPCs. However, the statistical and geochemical evaluations determined that the metals detected in site media were all naturally occurring. In addition to the metals COPCs, the PAH compound benzo(a)pyrene was identified as a COPC because it was detected in one surface soil sample at an estimated concentration exceeding its SSSL. However, the benzo(a)pyrene result was below its background screening value and is not considered a threat to human health. These conclusions are consistent with the findings of an SRA previously completed as part of the

EE/CA for Parcel 231(7) (IT, 2002b). Furthermore, the suspected source of the PAHs (the asphalt debris) has been removed from the ground surface.

Various metals (arsenic, barium, iron, lead, mercury, selenium, and vanadium) were detected in site media at concentrations exceeding ESVs and background and, thus, were selected as COPECs. However, the statistical and geochemical evaluations determined that the metals detected in site media were all naturally occurring. Two pesticides (4,4'-DDE and 4,4'-DDT) from two sample locations, and four PAHs (anthracene, benzo[a]pyrene, fluoranthene, and pyrene) from one location, were also identified as COPECs in surface soil. The PAH concentrations, however, were below their respective background screening values, and, as previously noted, the suspected source of the PAHs (asphalt debris) has been removed. Although the pesticides exceeded their ESVs, they were infrequently detected in surface soil and were not detected in any other ecological site media of concern. Furthermore, the Fill Area at Range 30 provides very low quality aquatic and terrestrial habitat. Therefore, it is concluded that the pesticides do not pose an unacceptable threat to ecological receptors at this site. These conclusions are consistent with the findings of the SLERA previously completed as part of the EE/CA for the Fill Area at Range 30 (IT, 2002b).

Based on the results of the SI, past operations at the Fill Area at Range 30 have not adversely impacted the environment. The metals and chemical compounds detected in site media do not pose an unacceptable risk to human health or the environment. Therefore, Shaw Environmental, Inc. recommends "No Further Action" and unrestricted land reuse with regard to CERCLA-related hazardous substances at the Fill Area at Range 30, Parcel 231(7).

7.0 References

American Society for Testing and Materials (ASTM), 2000, ***Standard Practice for Description and Identification of Soils (Visual-Manual Procedure),*** ASTM D 2488-00.

Cloud, P. E., Jr., 1966, ***Bauxite Deposits of the Anniston, Fort Payne, and Ashville Areas, Northeast Alabama,*** U. S. Geological Survey Bulletin 1199-O.

Environmental Science and Engineering, Inc. (ESE), 1998, ***Final Environmental Baseline Survey, Fort McClellan, Alabama***, prepared for U.S. Army Environmental Center, Aberdeen Proving Ground, Maryland, January.

Hunt, Roy E., 1986, ***Geotechnical Engineering Techniques and Practices,*** McGraw-Hill Book Co., New York.

IT Corporation (IT), 2002a, ***Draft Final Site Investigation and Fill Area Definition Report, Landfills and Fill Areas, Parcels 78(6), 79(6), 80(6), 81(5), 175(5), 230(7), 227(7), 229(7), 126(7), 229(7), 231(7), 233(7) and 82(7), Fort McClellan, Calhoun County, Alabama***, March.

IT Corporation (IT), 2002b, ***Draft Final Engineering Evaluation/Cost Analysis, Landfills and Fill Areas, Parcels 78(6), 79(6), 80(6), 81(5), 175(5), 230(7), 227(7), 126(7), 229(7), 231(7), 233(7), and 82(7), Fort McClellan, Calhoun County, Alabama***, March.

IT Corporation (IT), 2000a, ***Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama***, July.

IT Corporation (IT), 2000b, Letter to Ellis Pope (USACE) from Jeanne Yacoub (IT), "Groundwater Resampling Results", August 7.

IT Corporation (IT), 1998a, ***Final Site Investigations, Site-Specific Field Sampling Plan and Site-Specific Safety and Health Plan Attachments, Fill Area East End Reilly Airfield (Parcel 227), Fill Area Northwest of Reilly Airfield (Parcel 229), Drain Field (Building T-459) (Parcel 236Q), Fill Area at Range 30, (Parcel 231), Fort McClellan, Calhoun County, Alabama***, December.

IT Corporation (IT), 1998b, ***Final Installation-Wide Work Plan, Fort McClellan, Calhoun County, Alabama***, August.

IT Corporation (IT), 1998c, ***Final Installation-Wide Sampling and Analysis Plan, Fort McClellan, Calhoun County, Alabama***, August.

Moser, P. H., and S. S. DeJarnette, 1992, ***Ground-water Availability in Calhoun County, Alabama,*** Geological Survey of Alabama Special Map 228.

Osborne, W. E., 1999, personal communication with John Hofer, IT Corporation.

Osborne, W. E., and M. W. Szabo, 1984, ***Stratigraphy and Structure of the Jacksonville Fault, Calhoun County, Alabama,*** Alabama Geological Survey Circular 117.

Osborne, W. E., G. D. Irving, and W. E. Ward, 1997, ***Geologic Map of the Anniston 7.5' Quadrangle, Calhoun County, Alabama,*** Alabama Geologic Survey Preliminary Map, 1 sheet.

Osborne, W. E., M. W. Szabo, C. W. Copeland, Jr., and T. L. Neathery, 1989, ***Geologic Map of Alabama,*** Alabama Geologic Survey Special Map 221, scale 1:500,000, 1 sheet.

Osborne, W. E., M. W. Szabo, T. L. Neathery, and C. W. Copeland, compilers, 1988, ***Geologic Map of Alabama, Northeast Sheet***, Geological Survey of Alabama Special Map 220, Scale 1:250,000.

Raymond, D. E., W. E. Osborne, C. W. Copeland, and T. L. Neathery, 1988, ***Alabama Stratigraphy***, Geological Survey of Alabama, Tuscaloosa, Alabama.

Science Applications International Corporation (SAIC), 1998, ***Final Background Metals Survey Report, Fort McClellan, Alabama***, July.

Shaw Environmental, Inc. (Shaw), 2003a, ***Final Wetland Determination, Landfills and Fill Areas, Fort McClellan, Calhoun County, Alabama***, April.

Shaw Environmental, Inc. (Shaw), 2003b, "Selecting Site-Related Chemicals for Human Health and Ecological Risk Assessments for FTMC: Revision 2," technical memorandum dated June 24.

Thomas, W. A., and J. A. Drahovzal, 1974, ***The Coosa Deformed Belt in the Alabama Appalachians***, Alabama Geological Society, 12th Annual Field Trip Guidebook.

Thomas, W. A., and T. L. Neathery, 1982, ***Appalachian Thrust Belts in Alabama: Tectonics and Sedimentation***, Geologic Society of America 1982 Annual Meeting, New Orleans, Louisiana, Field Trip, Alabama Geological Society Guidebook 19A.

U.S. Army Corps of Engineers (USACE), 2001a, ***Fort McClellan Archives Search Report, Conclusions and Recommendations,*** Revision 1, September.

U.S. Army Corps of Engineers (USACE), 2001b, ***Requirements for the Preparation of Sampling and Analysis Plans***, Engineer Manual EM 200-1-3, February.

U.S. Army Corps of Engineers (USACE), 1987, ***Corps of Engineers Wetlands Delineation Manual***, Wetlands Research Program Technical Report T-87-1, January.

U.S. Environmental Protection Agency (EPA), 1990, ***Installation Assessment, Army Closure Program, Fort McClellan, Anniston, Alabama*** **(TS-PIC-89334),** Environmental Photographic Interpretation Center Report (EPIC), Environmental Monitoring Systems Laboratory.

U.S. Department of Agriculture, 1961, ***Soil Survey, Calhoun County, Alabama***, Soil Conservation Service, Series 1958, No. 9, September.

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, 1998, Unedited Local Climatological Data, Anniston, Alabama, January – December 1998.

Warman, J. C, and L. V. Causey, 1962, ***Geology and Ground-water Resources of Calhoun County, Alabama,*** Alabama Geological Survey County Report 7.

ATTACHMENT 1

LIST OF ABBREVIATIONS AND ACRONYMS

List of Abbreviations and Acronyms

2-ADNT	2-amino-4,6-dinitrotoluene
4-ADNT	4-amino-2,6-dinitrotoluene
2,4-D	2,4-dichlorophenoxyacetic acid
2,4,5-T	2,4,5-trichlorophenoxyacetic acid
2,4,5-TP	2,4,5-trichlorophenoxypropionic acid
3D	3D International Environmental Group
AB	ambient blank
AbB3	Anniston gravelly clay loam, 2 to 6 percent slopes, severely eroded
AbC3	Anniston gravelly clay loam, 6 to 10 percent slopes, severely eroded
AbD3	Anniston and Allen gravelly clay loams, 10 to 15 percent slopes, eroded
ABLM	adult blood lead model
Abs	skin absorption
ABS	dermal absorption factor
AC	hydrogen cyanide
ACAD	AutoCadd
AcB2	Anniston and Allen gravelly loams, 2 to 6 percent slopes, eroded
AcC2	Anniston and Allen gravelly loams, 6 to 10 percent slopes, eroded
AcD2	Anniston and Allen gravelly loams, 10 to 15 percent slopes, eroded
AcE2	Anniston and Allen gravelly loams, 15 to 25 percent slopes, eroded
ACGIH	American Conference of Governmental Industrial Hygienists
AdE	Anniston and Allen stony loam, 10 to 25 percent slope
ADEM	Alabama Department of Environmental Management
ADPH	Alabama Department of Public Health
AEC	U.S. Army Environmental Center
AEDA	ammunition, explosives, and other dangerous articles
AEL	airborne exposure limit
AET	adverse effect threshold
AF	soil-to-skin adherence factor
AHA	ammunition holding area
AL	Alabama
ALARNG	Alabama Army National Guard
ALAD	δ-aminolevulinic acid dehydratase
ALDOT	Alabama Department of Transportation
amb.	amber
amsl	above mean sea level
ANAD	Anniston Army Depot
AOC	area of concern
AP	armor piercing
APEC	areas of potential ecological concern
APT	armor-piercing tracer
AR	analysis request
ARAR	applicable or relevant and appropriate requirement
AREE	area requiring environmental evaluation
AS/SVE	air sparging/soil vapor extraction
ASP	Ammunition Supply Point
ASR	Archives Search Report
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
AT	averaging time
atm-m^3/mol	atmospheres per cubic meter per mole
ATSDR	Agency for Toxic Substances and Disease Registry
ATV	all-terrain vehicle
AUF	area use factor
AWARE	Associated Water and Air Resources Engineers, Inc.
AWQC	ambient water quality criteria
AWWSB	Anniston Water Works and Sewer Board
‘B’	Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero)
BAF	bioaccumulation factor
BBGR	Baby Bains Gap Road
BCF	blank correction factor; bioconcentration factor
BCT	BRAC Cleanup Team
BERA	baseline ecological risk assessment
BEHP	bis(2-ethylhexyl)phthalate
BFB	bromofluorobenzene
BFE	base flood elevation
BG	Bacillus globigii
BGR	Bains Gap Road
bgs	below ground surface
BHC	hexachlorocyclohexane
BHHRA	baseline human health risk assessment
BIRTC	Branch Immaterial Replacement Training Center
bkg	background
bls	below land surface
BOD	biological oxygen demand
Bp	soil-to-plant biotransfer factors
BRAC	Base Realignment and Closure
Braun	Braun Intertec Corporation
BSAF	biota-to-sediment accumulation factors
BSC	background screening criterion
BTAG	Biological Technical Assistance Group
BTEX	benzene, toluene, ethyl benzene, and xylenes
BTOC	below top of casing
BTV	background threshold value
BW	biological warfare; body weight
BZ	breathing zone; 3-quinuclidinyl benzilate
C	ceiling limit value
Ca	carcinogen
$CaCO_3$	calcium carbonate
CAA	Clean Air Act
CAB	chemical warfare agent breakdown products
CACM	Chemical Agent Contaminated Media
CAIS	chemical agent identification set
CAMU	corrective action management unit
CBR	chemical, biological, and radiological
CCAL	continuing calibration
CCB	continuing calibration blank
CCV	continuing calibration verification
CD	compact disc
CDTF	Chemical Defense Training Facility
CEHNC	U.S. Army Engineering and Support Center, Huntsville
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERFA	Community Environmental Response Facilitation Act
CESAS	Corps of Engineers South Atlantic Savannah
CF	conversion factor
CFC	chlorofluorocarbon
CFDP	Center for Domestic Preparedness
CFR	Code of Federal Regulations
CG	phosgene (carbonyl chloride)
CGI	combustible gas indicator
ch	inorganic clays of high plasticity
CHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
CIH	Certified Industrial Hygienist
CK	cyanogen chloride
cl	inorganic clays of low to medium plasticity
Cl	chlorinated
CLP	Contract Laboratory Program
cm	centimeter
CN	chloroacetophenone
CNB	chloroacetophenone, benzene, and carbon tetrachloride
CNS	chloroacetophenone, chloropicrin, and chloroform
CO	carbon monoxide
CO_2	carbon dioxide
Co-60	cobalt-60
CoA	Code of Alabama
COC	chain of custody; chemical of concern
COE	Corps of Engineers
Con	skin or eye contact
COPC	chemical of potential concern
COPEC	constituent of potential ecological concern
CPOM	coarse particulate organic matter
CPSS	chemicals present in site samples
CQCSM	Contract Quality Control System Manager
CRDL	contract-required detection limit
CRL	certified reporting limit
CRQL	contract-required quantitation limit
CRZ	contamination reduction zone
Cs-137	cesium-137
CS	ortho-chlorobenzylidene-malononitrile
CSEM	conceptual site exposure model
CSM	conceptual site model
CT	central tendency
ctr.	container
CWA	chemical warfare agent; Clean Water Act

List of Abbreviations and Acronyms *(Continued)*

CWM	chemical warfare material; clear, wide mouth
CX	dichloroformoxime
'D'	duplicate; dilution
D&I	detection and identification
DAAMS	depot area agent monitoring station
DAF	dilution-attenuation factor
DANC	decontamination agent, non-corrosive
ºC	degrees Celsius
ºF	degrees Fahrenheit
DCA	dichloroethane
DCE	dichloroethene
DD	Defense Department
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethene
DDT	dichlorodiphenyltrichloroethane
DEH	Directorate of Engineering and Housing
DEHP	di(2-ethylhexyl)phthalate
DEP	depositional soil
DFTPP	decafluorotriphenylphosphine
DI	deionized
DID	data item description
DIMP	di-isopropylmethylphosphonate
DM	dry matter; adamsite
DMBA	dimethylbenz(a)anthracene
DMMP	dimethylmethylphosphonate
DNAPL	dense nonaqueous-phase liquid
DNT	dinitrotoluene
DO	dissolved oxygen
DOD	U.S. Department of Defense
DOJ	U.S. Department of Justice
DOT	U.S. Department of Transportation
DP	direct-push
DPDO	Defense Property Disposal Office
DPT	direct-push technology
DQO	data quality objective
DRMO	Defense Reutilization and Marketing Office
DRO	diesel range organics
DS	deep (subsurface) soil
DS2	Decontamination Solution Number 2
DSERTS	Defense Site Environmental Restoration Tracking System
DWEL	drinking water equivalent level
E&E	Ecology and Environment, Inc.
EB	equipment blank
EBC	Eastern Bypass Corridor
EBS	environmental baseline survey
EBV	EBV Explosives Environmental Co.
EC_{20}	effects concentration for 20 percent of a test population
EC_{50}	effects concentration for 50 percent of a test population
ECBC	Edgewood Chemical Biological Center
ED	exposure duration
EDD	electronic data deliverable
EF	exposure frequency
EDQL	ecological data quality level
EE/CA	engineering evaluation and cost analysis
Eh	oxidation-reduction potential
Elev.	elevation
EM	electromagnetic
EMI	Environmental Management Inc.
EM31	Geonics Limited EM31 Terrain Conductivity Meter
EM61	Geonics Limited EM61 High-Resolution Metal Detector
EOD	explosive ordnance disposal
EODT	explosive ordnance disposal team
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
EPIC	Environmental Photographic Interpretation Center
EPRI	Electrical Power Research Institute
EPT	Ephemeroptera, Plecoptera, Trichoptera
ER	equipment rinsate
ERA	ecological risk assessment
ER-L	effects range-low
ER-M	effects range-medium
ESE	Environmental Science and Engineering, Inc.
ESL	ecological screening level
ESMP	Endangered Species Management Plan
ESN	Environmental Services Network, Inc.
ESV	ecological screening value
ET	exposure time
EU	exposure unit
Exp.	Explosives
EXTOXNET	Extension Toxicology Network
E-W	east to west
EZ	exclusion zone
FAR	Federal Acquisition Regulations
FB	field blank
FBI	Family Biotic Index
FD	field duplicate
FDC	Former Decontamination Complex
FDA	U.S. Food and Drug Administration
Fe^{+3}	ferric iron
Fe^{+2}	ferrous iron
FedEx	Federal Express, Inc.
FEMA	Federal Emergency Management Agency
FFCA	Federal Facilities Compliance Act
FFE	field flame expedient
FFS	focused feasibility study
FI	fraction of exposure
Fil	filtered
Flt	filtered
FMDC	Fort McClellan Development Commission
FML	flexible membrane liner
f_{oc}	fraction organic carbon
FOMRA	Former Ordnance Motor Repair Area
FOST	Finding of Suitability to Transfer
Foster Wheeler	Foster Wheeler Environmental Corporation
FR	Federal Register
Frtn	fraction
FS	field split; feasibility study; fuming sulfuric acid
FSP	field sampling plan
ft	feet
ft/day	feet per day
ft/ft	feet per foot
ft/yr	feet per year
FTA	Fire Training Area
FTMC	Fort McClellan
FTRRA	FTMC Reuse & Redevelopment Authority
g	gram
g/m^3	gram per cubic meter
G-856	Geometrics, Inc. G-856 magnetometer
G-858G	Geometrics, Inc. G-858G magnetic gradiometer
GAF	gastrointestinal absorption factor
gal	gallon
gal/min	gallons per minute
GB	sarin (isopropyl methylphosphonofluoridate)
gc	clay gravels; gravel-sand-clay mixtures
GC	gas chromatograph
GCL	geosynthetic clay liner
GC/MS	gas chromatograph/mass spectrometer
GCR	geosynthetic clay liner
GFAA	graphite furnace atomic absorption
GIS	Geographic Information System
gm	silty gravels; gravel-sand-silt mixtures
gp	poorly graded gravels; gravel-sand mixtures
gpm	gallons per minute
GPR	ground-penetrating radar
GPS	global positioning system
GRA	general response action
GS	ground scar
GSA	General Services Administration; Geologic Survey of Alabama
GSBP	Ground Scar Boiler Plant
GSSI	Geophysical Survey Systems, Inc.
GST	ground stain
GW	groundwater
gw	well-graded gravels; gravel-sand mixtures
H&S	health and safety

List of Abbreviations and Acronyms (Continued)

HA	hand auger
HC	mixture of hexachloroethane, aluminum powder, and zinc oxide (smoke producer)
HCl	hydrochloric acid
HD	distilled mustard (bis-[dichloroethyl]sulfide)
HDPE	high-density polyethylene
HE	high explosive
HEAST	Health Effects Assessment Summary Tables
Herb.	herbicides
HHRA	human health risk assessment
HI	hazard index
HN	hydrogen mustard
H_2O_2	hydrogen peroxide
HPLC	high-performance liquid chromatography
HNO_3	nitric acid
HQ	hazard quotient
HQ_{screen}	screening-level hazard quotient
hr	hour
HRC	hydrogen releasing compound
HSA	hollow-stem auger
HSDB	Hazardous Substance Data Bank
HTRW	hazardous, toxic, and radioactive waste
‘I’	out of control, data rejected due to low recovery
IASPOW	Impact Area South of POW Training Facility
IATA	International Air Transport Authority
ICAL	initial calibration
ICB	initial calibration blank
ICP	inductively-coupled plasma
ICRP	International Commission on Radiological Protection
ICS	interference check sample
ID	inside diameter
IDL	instrument detection limit
IDLH	immediately dangerous to life or health
IDM	investigative-derived media
IDW	investigation-derived waste
IEUBK	Integrated Exposure Uptake Biokinetic
IF	ingestion factor; inhalation factor
ILCR	incremental lifetime cancer risk
IMPA	isopropylmethyl phosphonic acid
IMR	Iron Mountain Road
in.	inch
Ing	ingestion
Inh	inhalation
IP	ionization potential
IPS	International Pipe Standard
IR	ingestion rate
IRDMIS	Installation Restoration Data Management Information System
IRIS	Integrated Risk Information Service
IRP	Installation Restoration Program
IS	internal standard
ISCP	Installation Spill Contingency Plan
IT	IT Corporation
ITEMS	IT Environmental Management System™
‘J’	estimated concentration
JeB2	Jefferson gravelly fine sandy loam, 2 to 6 percent slopes, eroded
JeC2	Jefferson gravelly fine sandy loam, 6 to 10 percent slopes, eroded
JfB	Jefferson stony fine sandy loam, 0 to 10 percent slopes have strong slopes
JPA	Joint Powers Authority
K	conductivity
K_d	soil-water distribution coefficient
kg	kilogram
KeV	kilo electron volt
K_{oc}	organic carbon partioning coefficient
K_{ow}	octonal-water partition coefficient
$KMnO_4$	potassium permanganate
L	liter; Lewisite (dichloro-[2-chloroethyl]sulfide)
L/kg/day	liters per kilogram per day
l	liter
LAW	light anti-tank weapon
lb	pound
LBP	lead-based paint
LC	liquid chromatography
LCS	laboratory control sample
LC_{50}	lethal concentration for 50 percent population tested
LD_{50}	lethal dose for 50 percent population tested
LEL	lower explosive limit
LOAEL	lowest-observed-advserse-effects-level
LOEC	lowest-observable-effect-concentration
LRA	land redevelopment authority
LT	less than the certified reporting limit
LUC	land-use control
LUCAP	land-use control assurance plan
LUCIP	land-use control implementation plan
max	maximum
MB	method blank
MCL	maximum contaminant level
MCLG	maximum contaminant level goal
MCPA	4-chloro-2-methylphenoxyacetic acid
MCPP	2-(2-methyl-4-chlorophenoxy)propionic acid
MCS	media cleanup standard
MD	matrix duplicate
MDC	maximum detected concentration
MDCC	maximum detected constituent concentration
MDL	method detection limit
mg	milligrams
mg/kg	milligrams per kilogram
mg/kg/day	milligram per kilogram per day
mg/kgbw/day	milligrams per kilogram of body weight per day
mg/L	milligrams per liter
mg/m^3	milligrams per cubic meter
mh	inorganic silts, micaceous or diatomaceous fine, sandy or silt soils
MHz	megahertz
µg/g	micrograms per gram
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
µmhos/cm	micromhos per centimeter
MEC	munitions and explosives of concern
MeV	mega electron volt
min	minimum
MINICAMS	miniature continuous air monitoring system
ml	inorganic silts and very fine sands
mL	milliliter
mm	millimeter
MM	mounded material
MMBtu/hr	million Btu per hour
MNA	monitored natural attenuation
MnO_4-	permanganate ion
MOA	Memorandum of Agreement
MOGAS	motor vehicle gasoline
MOUT	Military Operations in Urban Terrain
MP	Military Police
MPA	methyl phosphonic acid
MPC	maximum permissible concentration
MPM	most probable munition
MQL	method quantitation limit
MR	molasses residue
MRL	method reporting limit
MS	matrix spike
mS/cm	millisiemens per centimeter
mS/m	millisiemens per meter
MSD	matrix spike duplicate; minimum separation distance
MTBE	methyl tertiary butyl ether
msl	mean sea level
MtD3	Montevallo shaly, silty clay loam, 10 to 40 percent slopes , severely eroded
mV	millivolts
MW	monitoring well
MWI&MP	Monitoring Well Installation and Management Plan
Na	sodium
NA	not applicable; not available
NAD	North American Datum
NAD83	North American Datum of 1983
$NaMnO_4$	sodium permanganate
NAVD88	North American Vertical Datum of 1988
NAS	National Academy of Sciences
NCEA	National Center for Environmental Assessment

NCP	National Contingency Plan
NCRP	National Council on Radiation Protection and Measurements
ND	not detected
NE	no evidence; northeast
ne	not evaluated
NEW	net explosive weight
NFA	No Further Action
NG	National Guard
NGP	National Guardsperson
ng/L	nanograms per liter
NGVD	National Geodetic Vertical Datum
Ni	nickel
NIC	notice of intended change
NIOSH	National Institute for Occupational Safety and Health
NIST	National Institute of Standards and Technology
NLM	National Library of Medicine
NO_3^-	nitrate
NOEC	no-observable-effect-concentration
NPDES	National Pollutant Discharge Elimination System
NPW	net present worth
No.	number
NOAA	National Oceanic and Atmospheric Administration
NOAEL	no-observed-adverse-effects-level
NR	not requested; not recorded; no risk
NRC	National Research Council
NRCC	National Research Council of Canada
NRHP	National Register of Historic Places
NRT	near real time
ns	nanosecond
N-S	north to south
NS	not surveyed
NSA	New South Associates, Inc.
nT	nanotesla
nT/m	nanoteslas per meter
NTU	nephelometric turbidity unit
nv	not validated
O_2	oxygen
O_3	ozone
O&G	oil and grease
O&M	operation and maintenance
OB/OD	open burning/open detonation
OD	outside diameter
OE	ordnance and explosives
oh	organic clays of medium to high plasticity
OH•	hydroxyl radical
ol	organic silts and organic silty clays of low plasticity
OP	organophosphorus
ORC	Oxygen Releasing Compound
ORP	oxidation-reduction potential
OSHA	Occupational Safety and Health Administration
OSWER	Office of Solid Waste and Emergency Response
OVM-PID/FID	organic vapor meter-photoionization detector/flame ionization detector
OWS	oil/water separator
oz	ounce
PA	preliminary assessment
PAH	polynuclear aromatic hydrocarbon
PARCCS	precision, accuracy, representativeness, comparability, completeness, and sensitivity
Parsons	Parsons Engineering Science, Inc.
Pb	lead
PBMS	performance-based measurement system
PC	permeability coefficient
PCB	polychlorinated biphenyl
PCDD	polychlorinated dibenzo-p-dioxins
PCDF	polychlorinated dibenzofurans
PCE	perchloroethene
PCP	pentachlorophenol
PDS	Personnel Decontamination Station
PEF	particulate emission factor
PEL	permissible exposure limit
PERA	preliminary ecological risk assessment
PERC	perchloroethene
PES	potential explosive site
Pest.	pesticides
PETN	pentaerythritoltetranitrate
PFT	portable flamethrower
PG	professional geologist
PID	photoionization detector
PkA	Philo and Stendal soils local alluvium, 0 to 2 percent slopes
PM	project manager
POC	point of contact
POL	petroleum, oils, and lubricants
POTW	publicly owned treatment works
POW	prisoner of war
PP	peristaltic pump; Proposed Plan
ppb	parts per billion
ppbv	parts per billion by volume
PPE	personal protective equipment
ppm	parts per million
PPMP	Print Plant Motor Pool
ppt	parts per thousand
PR	potential risk
PRA	preliminary risk assessment
PRG	preliminary remediation goal
PS	chloropicrin
PSSC	potential site-specific chemical
pt	peat or other highly organic silts
PVC	polyvinyl chloride
QA	quality assurance
QA/QC	quality assurance/quality control
QAM	quality assurance manual
QAO	quality assurance officer
QAP	installation-wide quality assurance plan
QC	quality control
QST	QST Environmental, Inc.
qty	quantity
Qual	qualifier
QuickSilver	QuickSilver Analytics, Inc.
R	rejected data; resample; retardation factor
R&A	relevant and appropriate
RA	remedial action
RAO	remedial action objective
RBC	risk-based concentration; red blood cell
RBRG	risk-based remedial goal
RCRA	Resource Conservation and Recovery Act
RCWM	Recovered Chemical Warfare Material
RD	remedial design
RDX	cyclotrimethylenetrinitramine
ReB3	Rarden silty clay loams
REG	regular field sample
REL	recommended exposure limit
RFA	request for analysis
RfC	reference concentration
RfD	reference dose
RGO	remedial goal option
RI	remedial investigation
RL	reporting limit
RME	reasonable maximum exposure
ROD	Record of Decision
RPD	relative percent difference
RR	range residue
RRF	relative response factor
RRSE	Relative Risk Site Evaluation
RSD	relative standard deviation
RTC	Recruiting Training Center
RTECS	Registry of Toxic Effects of Chemical Substances
RTK	real-time kinematic
RWIMR	Ranges West of Iron Mountain Road
SA	exposed skin surface area
SAD	South Atlantic Division
SAE	Society of Automotive Engineers
SAIC	Science Applications International Corporation
SAP	installation-wide sampling and analysis plan
SARA	Superfund Amendments and Reauthorization Act

sc	clayey sands; sand-clay mixtures
Sch.	schedule
SCM	site conceptual model
SD	sediment
SDG	sample delivery group
SDWA	Safe Drinking Water Act
SDZ	safe distance zone; surface danger zone
SEMS	Southern Environmental Management & Specialties, Inc.
SF	cancer slope factor
SFSP	site-specific field sampling plan
SGF	standard grade fuels
Shaw	Shaw Environmental, Inc.
SHP	installation-wide safety and health plan
SI	site investigation
SINA	Special Interest Natural Area
SL	standing liquid
SLERA	screening-level ecological risk assessment
sm	silty sands; sand-silt mixtures
SM	Serratia marcescens
SMDP	Scientific Management Decision Point
s/n	signal-to-noise ratio
SO_4^{-2}	sulfate
SOD	soil oxidant demand
SOP	standard operating procedure
SOPQAM	U.S. EPA's *Standard Operating Procedure/Quality Assurance Manual*
sp	poorly graded sands; gravelly sands
SP	submersible pump
SPCC	system performance calibration compound
SPCS	State Plane Coordinate System
SPM	sample planning module
SQRT	screening quick reference tables
Sr-90	strontium-90
SRA	streamlined human health risk assessment
SRI	supplemental remedial investigation
SRM	standard reference material
Ss	stony rough land, sandstone series
SS	surface soil
SSC	site-specific chemical
SSHO	site safety and health officer
SSHP	site-specific safety and health plan
SSL	soil screening level
SSSL	site-specific screening level
SSSSL	site-specific soil screening level
STB	supertropical bleach
STC	source-term concentration
STD	standard deviation
STEL	short-term exposure limit
STL	Severn-Trent Laboratories
STOLS	Surface Towed Ordnance Locator System®
Std. units	standard units
SU	standard unit
SUXOS	senior UXO supervisor
SVOC	semivolatile organic compound
SW	surface water
SW-846	U.S. EPA's *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*
SWMU	solid waste management unit
SWPP	storm water pollution prevention plan
SZ	support zone
TAL	target analyte list
TAT	turn around time
TB	trip blank
TBC	to be considered
TCA	trichloroethane
TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
TCDF	tetrachlorodibenzofurans
TCE	trichloroethene
TCL	target compound list
TCLP	toxicity characteristic leaching procedure
TDEC	Tennessee Department of Environment and Conservation
TDGCL	thiodiglycol
TDGCLA	thiodiglycol chloroacetic acid
TEA	triethylaluminum
Tetryl	trinitrophenylmethylnitramine
TERC	Total Environmental Restoration Contract
TEU	Technical Escort Unit
THI	target hazard index
TIC	tentatively identified compound
TLV	threshold limit value
TN	Tennessee
TNB	trinitrobenzene
TNT	trinitrotoluene
TOC	top of casing; total organic carbon
TPH	total petroleum hydrocarbons
TR	target cancer risk
TRADOC	U.S. Army Training and Doctrine Command
TRPH	total recoverable petroleum hydrocarbons
TRV	toxicity reference value
TSCA	Toxic Substances Control Act
TSDF	treatment, storage, and disposal facility
TSS	total suspended solids
TWA	time-weighted average
UCL	upper confidence limit
UCR	upper certified range
'U'	not detected above reporting limit
UIC	underground injection control
UF	uncertainty factor
URF	unit risk factor
USACE	U.S. Army Corps of Engineers
USACHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
USAEC	U.S. Army Environmental Center
USAEHA	U.S. Army Environmental Hygiene Agency
USACMLS	U.S. Army Chemical School
USAMPS	U.S. Army Military Police School
USATCES	U.S. Army Technical Center for Explosive Safety
USATEU	U.S. Army Technical Escort Unit
USATHAMA	U.S. Army Toxic and Hazardous Material Agency
USC	United States Code
USCS	Unified Soil Classification System
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	underground storage tank
UTL	upper tolerance level; upper tolerance limit
UXO	unexploded ordnance
UXOQCS	UXO Quality Control Supervisor
UXOSO	UXO safety officer
V	vanadium
VC	vinyl chloride
VOA	volatile organic analyte
VOC	volatile organic compound
VOH	volatile organic hydrocarbon
VQlfr	validation qualifier
VQual	validation qualifier
VX	nerve agent (O-ethyl-S-[diisopropylaminoethyl]-methylphosphonothiolate)
WAC	Women's Army Corps
Weston	Roy F. Weston, Inc.
WP	installation-wide work plan
WRS	Wilcoxon rank sum
WS	watershed
WSA	Watershed Screening Assessment
WWI	World War I
WWII	World War II
XRF	x-ray fluorescence
yd^3	cubic yards